



International Space Station Program Status

7A.1 Flight Readiness Review





International Space Station

7A.1 Flight Readiness Review

- | | | |
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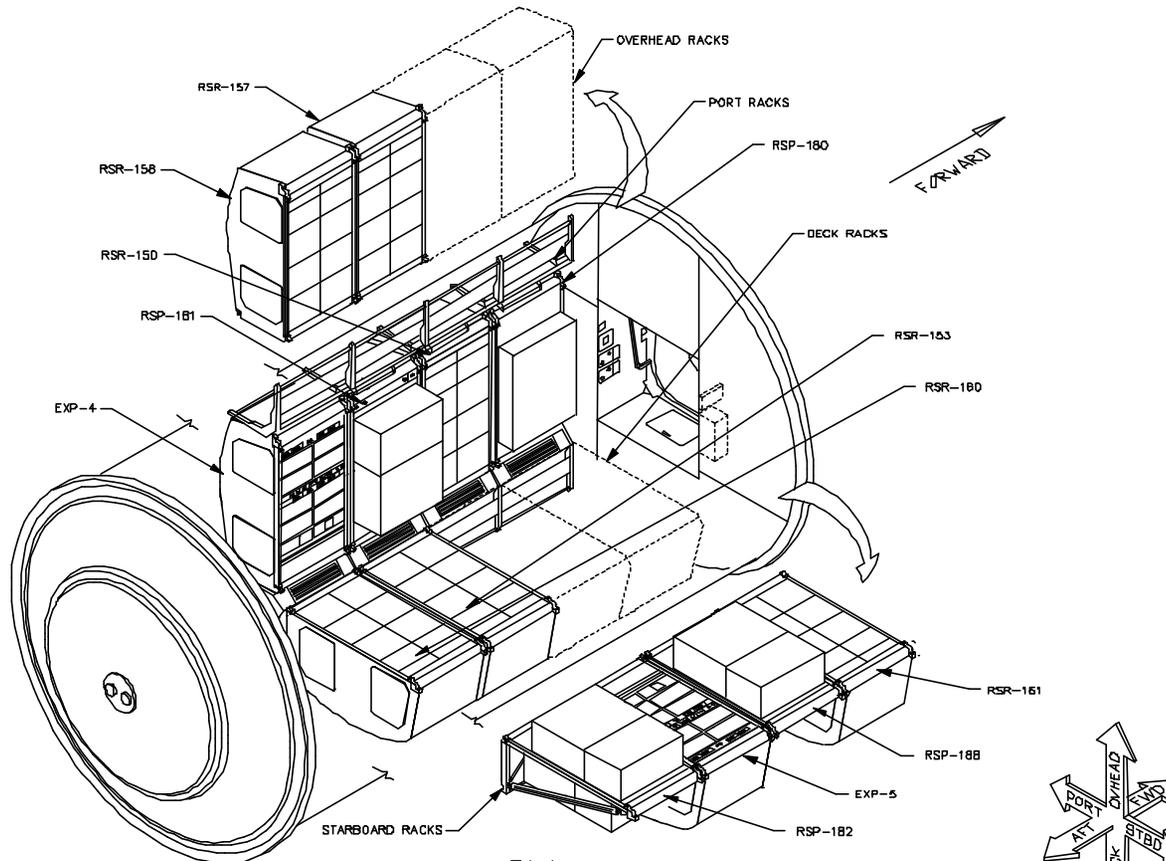


- **Mission Overview**
 - **7A.1/STS-105 Payload Stowage and configuration layouts**
 - MPLM
 - ICC
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 - **7A.1 Launch Commit Criteria**





7A.1 Payload Stowage and Configuration layout (MPLM)



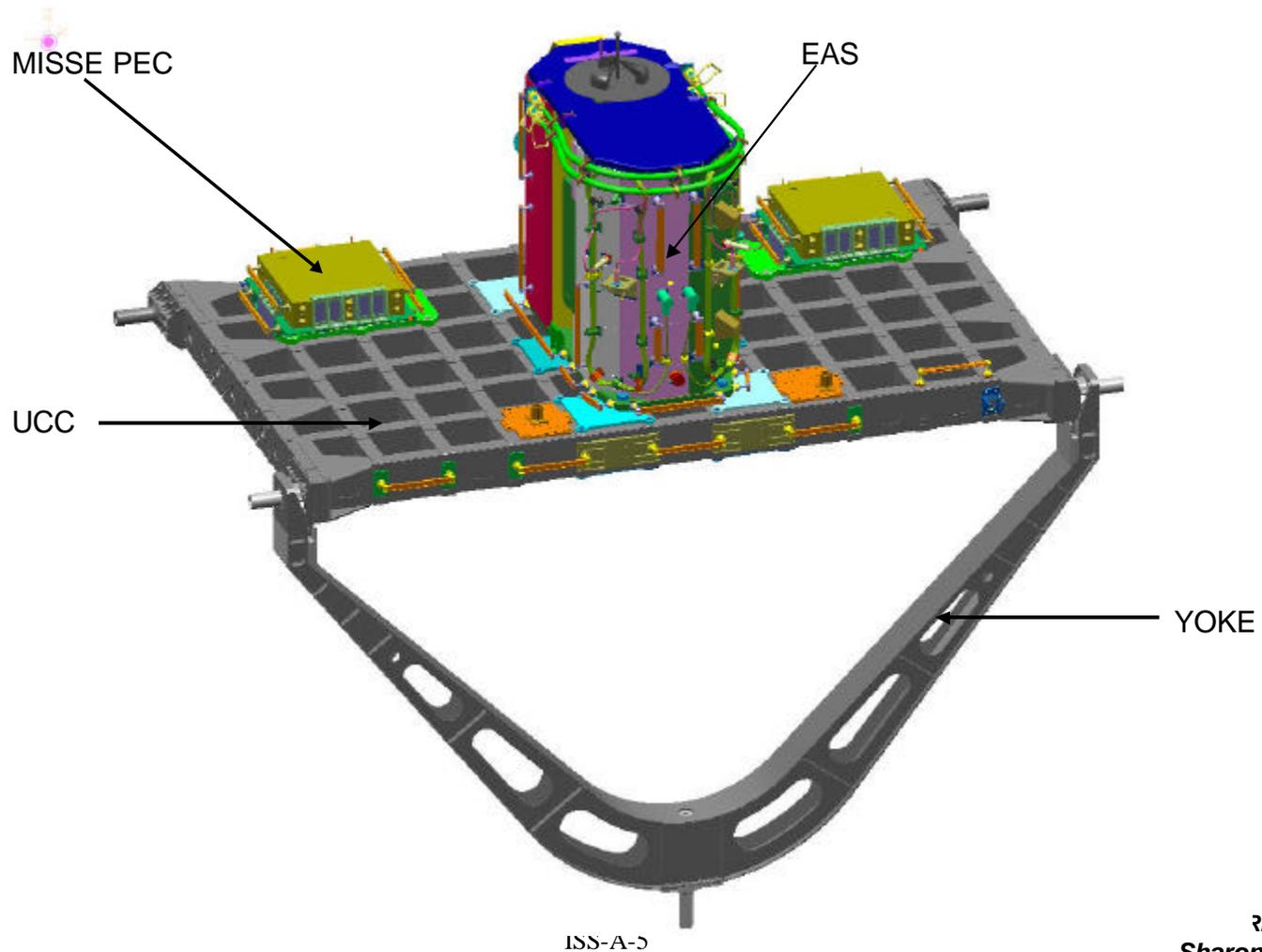
LAUNCH

7A.1
MULTI PURPOSE LOGISTIC MODULE-1
OVERHEAD, STARBOARD, PORT & DECK RACKS
(VIEW LOOKING FORWARD)





7A.1 Payload Stowage and Configuration layout (ICC)





7A.1 Significant Hardware



- Consumables
 - 76 Food Containers; 10 CWCs water
 - 40 CTBs of Crew Clothing & Provisions; 1 CTB Printer Supplies
 - 11 CTBs Photo/TV Re-supply Bag

- 12 CTBs CHECKS (TVIS, IRED, VOA, WMK, AMK)
 - TVIS Exercise Ops Kit; IRED FORE and AFT
 - Volatile Organic Analyzer
 - Water Microbiology Kit
 - Ambulatory Medical Kit

- 57 CTBs Utilization Hardware (Express Racks 4 & 5)
 - Advanced Protein Crystal Facility (APCF)
 - Biotechnology Refrigerator (BTR)
 - Dynamically Controlled-Protein Crystal Growth (DCPCG)
 - Dreamtime; Human Research Facility (HRF)
 - Biotechnology Cell Science Stowage (BCSS)
 - Biotechnology Specimen Temperature Controller(BSTC)
 - MISSE Passive Experiment Carriers (PECs)

- Temporary Sleep Station (TESS)
- Early Ammonia Servicer (EAS)
- SO LTA ORU Heater Power Cables





ISS GFE Flight Project Office Hardware by System



ECLSS

Water Transfer Equipment
Portable Fire Extinguisher
Cover
Mask Holder Assy, PBA
Cylinder Mount Assy, PBA

CHeCS

Grab Sample Container
Passive Dosimetry Kit
Formaldehyde Monitor Kit
Water Microbiology Kit
Medical Equipment Computer (MEC)
CD Case
Volatile Organic Analyzer
Microbial Air Sampler Kit Assy
Ambulatory Medical Pack
Acoustic Countermeasures Hardware
ALSP Drug Pack
Surface Sampler Kit
Heart Rate Monitor Resupply Kit
IRED, Fore and Aft
CEVIS Resupply Kit
VOA Sample Bag Kit
TVIS Exercise Ops Kit
IRED Resupply Kit
Contingency Resistive Exercise System
IRED Handcrank Assy, Fore & Aft
Adult Blood Pressure Cuff

FCE/L&M

Crew Care Package
Handrail Assy (21.5" pre-
installed)
Cargo Transfer Bags
Radiation Protection Shielding
RSP BMRRM Bag
Temporary Sleep Station
Kit Assy ISS Pin Kit
Coldplate Wireway Kit Assy
Resupply Stowage Platform
M-01 Bag
M-02 Bag

ISS Photo/TV

Locker Items
35/70 Bag
Camcorder #1 Bag
Accessory Bag
Photo/TV Resupply Bag

PAYLOADS

High Torque Locker
Tool





ISS GFE Flight Projects Office First Flight - BMRRM Bag



M01 Bag

BMRRM Bag

ISS-A-8

7A.1 FRR - 8/01/01
Sharon Castle/LPM





ISS GFE Flight Projects Office First Flight - Temporary Sleep Station



ISS-A-9

7A.1 FRR – 8/01/01
Sharon Castle/LPM





7A.1 Mission Priorities

1. **Rotate Expedition 2 crew with Expedition 3 crew including**
 - mandatory crew equipment transfer
 - **crew handover with 30-minute ISS safety briefing.** [IVA]
2. Perform water transfer of mandatory quantities. [IVA]
3. Berth MPLM to NODE 1, activate and check out. [IVA, Robotics, Imagery]
4. **Transfer critical hardware** from Shuttle **to ISS** per the Flight 7A.1 Transfer Priority. [IVA]
5. Return MPLM to cargo bay. [Robotics, Imagery]
6. Transfer SM software CD and upload software for Docking Compartment.
7. Transfer and install the Early Ammonia Servicer (EAS), connect associated umbilicals and apply heater power to EAS. [EVA, IVA, Robotics, Imagery]
8. **Perform generic crew handover.** [IVA]
9. Transfer and stow EXPRESS racks #4 and #5 in the US Lab. [IVA, Imagery, Utilization]
10. Transfer the active payloads from Shuttle middeck to the US Lab and activate. [IVA, Util.]
11. **Transfer from the ISS critical return cargo** and stow in MPLM. [IVA]
12. **Transfer and stow remaining cargo** from Shuttle and MPLM **to ISS.** [IVA]
13. **Transfer and stow remaining cargo from ISS to Shuttle.** [IVA]
14. **Perform flight-specific crew handover.** [IVA]
15. Transfer, install and deploy MISSE. [EVA, Imagery, Utilization]





7A.1 Mission Priorities (cont'd)



16. Perform HRF (H-Reflex) experiment data collection. [IVA, Utilization]
17. Perform ITCS coolant loop sampling in the US Lab and return samples.[IVA]
18. Perform DREAMTIME payloads activities. [IVA, Utilization]
19. Install SO LTA cables. [EVA, Imagery]
20. Remove/locate 2 handrails from the US Lab in preparation for Flight 8A. [EVA, Imagery]

IF TIME PERMITS TASKS

21. Remove and replace TVIS motor if time available [IVA, Imagery]
22. Perform video survey of final ISS stowage and P/L transfer closeout if time permits. [IVA, Imagery]
23. Perform still photographic survey of the ISS. [IVA, Imagery]
24. Relocate APFR and tool stanchion with tools from WIF NOD-5 to WIF LAB-12 if time available. [EVA]
25. Relocate APFR from WIF Lab-08 to WIF Z1-12 if crew time permits. [EVA]





Launch Commit Criteria Statements



- **There are no 7A.1 Cargo Element Launch Commit Criteria**
- **One ISS Stage Driven Launch Commit Criteria**
 - **Single fault tolerant Nadir Node 1 CBM Systems**
 - **For MPLM berthing**
- **No mandatory hardware for crew rotation in MPLM**

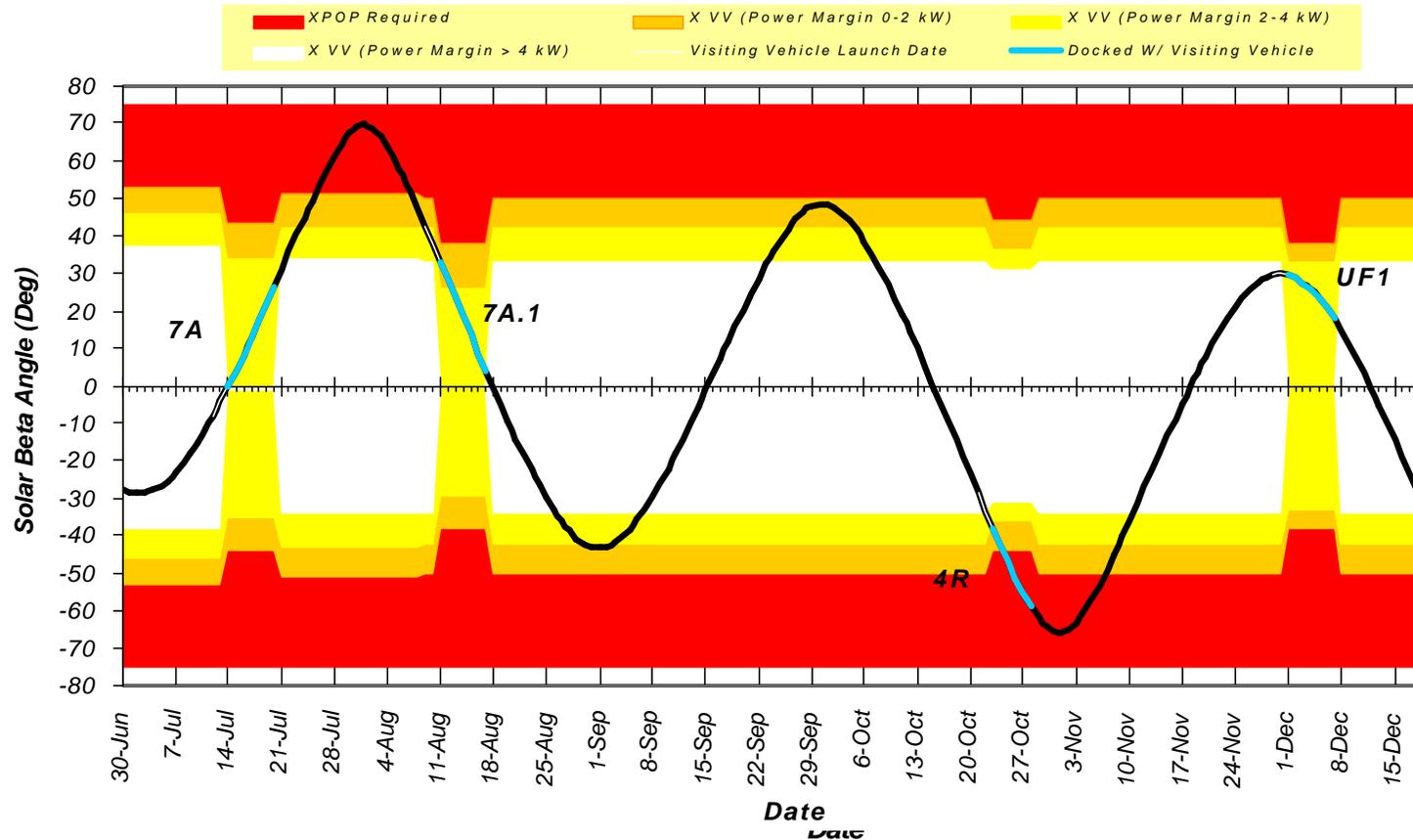




Flight Attitude vs. Stage & Solar Beta



Port PV Array (4B) fixed at 138 deg
April June 30-December 19, 2001. Rev G



(Provided by Fernando Gonzalez)

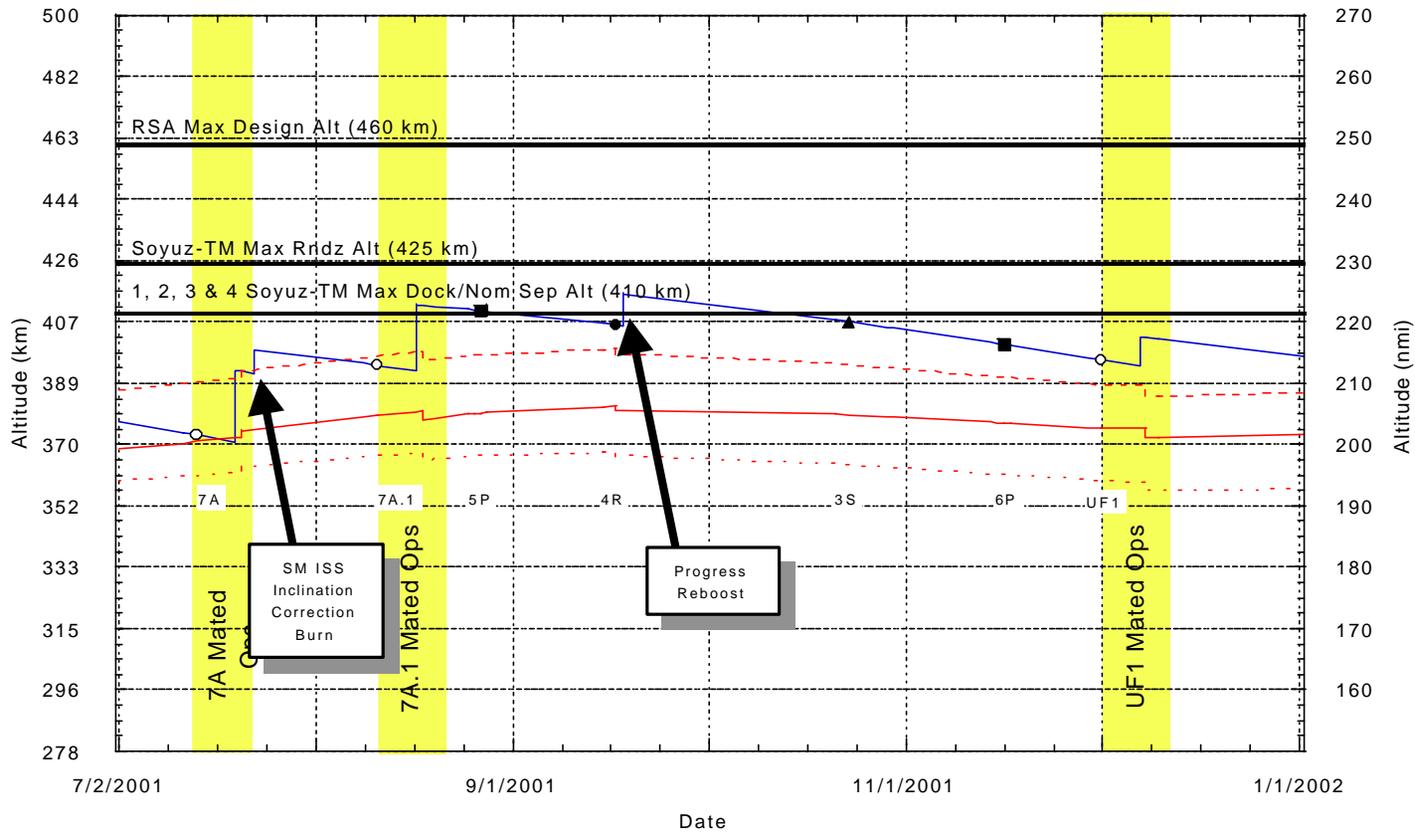
(Provided by Fernando Gonzalez)





Altitude & Lifetime

Assumes: MSFC 50th Percentile Estimate for Solar Cycle #23



(Provided By Max Keller)



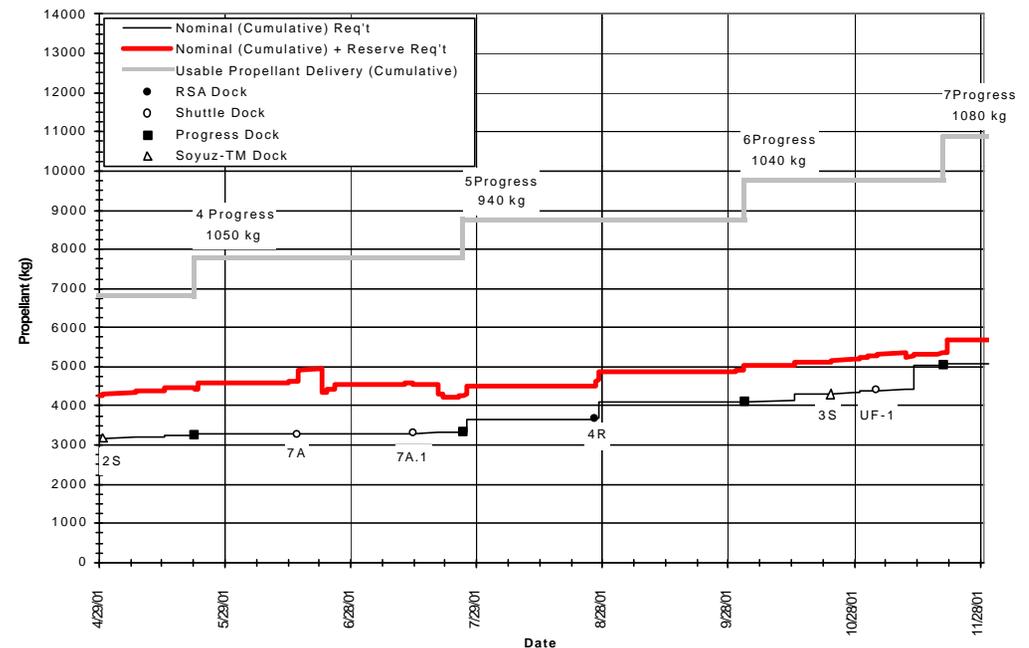


Propellant Resource Status



- **Propellant reserve requirements are being met**
- **Margin continues to grow due to Orbiter reboost contribution**
 - ◆ *Orbiter has saved ISS and average of 270 kg of prop per flight*
- **CMGs still maintaining non-propulsive attitude control**
 - ◆ *CMGs primary for attitude control*
 - ◆ *SM propulsion system used for reboost, attitude maneuvers, and de-saturation of CMGs*

Nominal & Reserve Propellant Requirements for the Rev. F Assembly Sequence
(Assumes: Marshall 50th Percentile Prediction for Solar Cycle #23)



(Provided by Max Keller)





Vehicle Performance



Energy Balance & Flight Attitudes

- XVV Z Nadir flight attitude provides integrated energy balance needs with one fixed (4B, Portside) array

Propellant

- ISS propellant reserve (skip cycle) requirement is being met
- ISS propellant is sufficient to protect for schedule slips





Vehicle Office

ISS Vehicle Office Flight Readiness Review



08/01/01



AGENDA



On-orbit Status

Walker

Special Topics:

- MPLM IMV Valve Leak
- Node 1 Fire Response During Campout
- MPLM PFE Hazard Analysis
- MPLM CBM Corrosion

Lewis
Lewis
Lewis
Holladay



On-Orbit Status

Shannon Walker



Flight 7A Configuration



S104E5066 2001/07/15 06:10:38



On-Orbit Hardware Status



Issues	New Since 7A FRR	Impact to 7A.1 Operations	Topic to be Presented	Additional Ground Testing or Open Work	On-Orbit Repair scheduled or required
BGA Rotation High Current	No	No	No	Yes	Considering ECU or BMRRM change-out
CMG – Outer Gimbal Bias, Current Spikes, Loss of Comm	Yes	No	Yes Avionics	Yes	No
MCOR	Yes	No	No	Yes	No (Spare on orbit)
C&C MDM Problems	No	No	Yes Avionics	Yes	No (Ops constraints)
ITCS Gas Trap	Yes	No	No	No	Yes (R&R Complete)
Regul System	Yes	No	No	No	Yes (R&R Complete)
EEPROM/RPCM Health Flags	Yes	No	No	Yes	Team tasked to look for long term fix
VTR	No	No	Yes Avionics	Yes	Yes
Airlock PBA Launched Empty	Yes	No	No	Yes	De-orbit on 7A.1, sufficient PBA's onboard
SLD Bungee Frayed	Yes	?	No	Yes	Yes?
.
.
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On-Orbit Hardware Status



Issues	New Since 7A FRR	Impact to 7A.1 Operations	Topic to be Presented	Additional Ground Testing or Open Work	On-Orbit Repair scheduled or required
Canadarm2	No	No	No	No	No (Patches available)
MCA Operations	No	No	No	Yes	Yes (R&R complete)
TVIS and IRED	No	Yes	No	No	Yes (TVIS spare, IRED IFM)
ZOE Recorder not Utilized	No	No	No	Yes	No
SM Air Conditioner #2	Yes	No	No	No	No (Repair complete)
Vozdukh Operation on 2 of 3 CO2 Beds	No	No	No	No	No (Spares on orbit)
CDRA Single Bed Ops	No	No	No	No	?
SM Rapid Depress Algorithm Disabled	No	No	No	Yes	Yes
MCA Operations	No	No	No	Yes	Yes (R&R Complete)
EEATCS Stbd Radiator plumbed incorrectly	No	No	No	No	No
1 of 4 BGA latching mechanisms not latched	No	No	No	No	No
Workarounds due to UOP trips	No	No	No	No	No



Airlock On Orbit Status

Issue	Status	7A.1 Impact	EVA Impact
IV Hatch – PEV leakage	Leakage rate 0.08 lbm/hr only during EVA	None	Minimal gas makeup required after EVA
Nitrogen Introduction Valve leakage	Leakage rate 0.026 lbm/day into ISS atmosphere – higher than ISS overboard leakage so system currently isolated	VOA requires N2 system active	System must be enabled during 10.2 depress
High Pressure O2 System leakage	Leakage rate 9 psi/hr source of leak not currently identified	None	Leakage not an impact during use of system
O2 Crossover Valve suspected leakage	Investigation of thermal impacts ongoing	None	Unknown at this time
O2 UIA Supply Line Pressure Low Caution toggling	Under investigation – cause of problem not identified	None	Unknown at this time
Airlock MPEV depress rate	Slow depress rate observed possibly due to icing on mufflers	None	Requires 38 minutes to depress crew lock from 5 psia to 0.5 psia

***Airlock is fully operational and fully supports Vehicle operations**



On-Orbit Summary



- None of the identified items for investigation regarding the on-orbit configuration represent a constraint to the flight of 7A.1
- Airlock ready for Mission and Stage EVA
- The MER/ESR personnel and facilities will be ready to support



MPLM IMV Valve Leak

John Lewis



MPLM IMV Valve Leak Test Failures

PRACA 2331

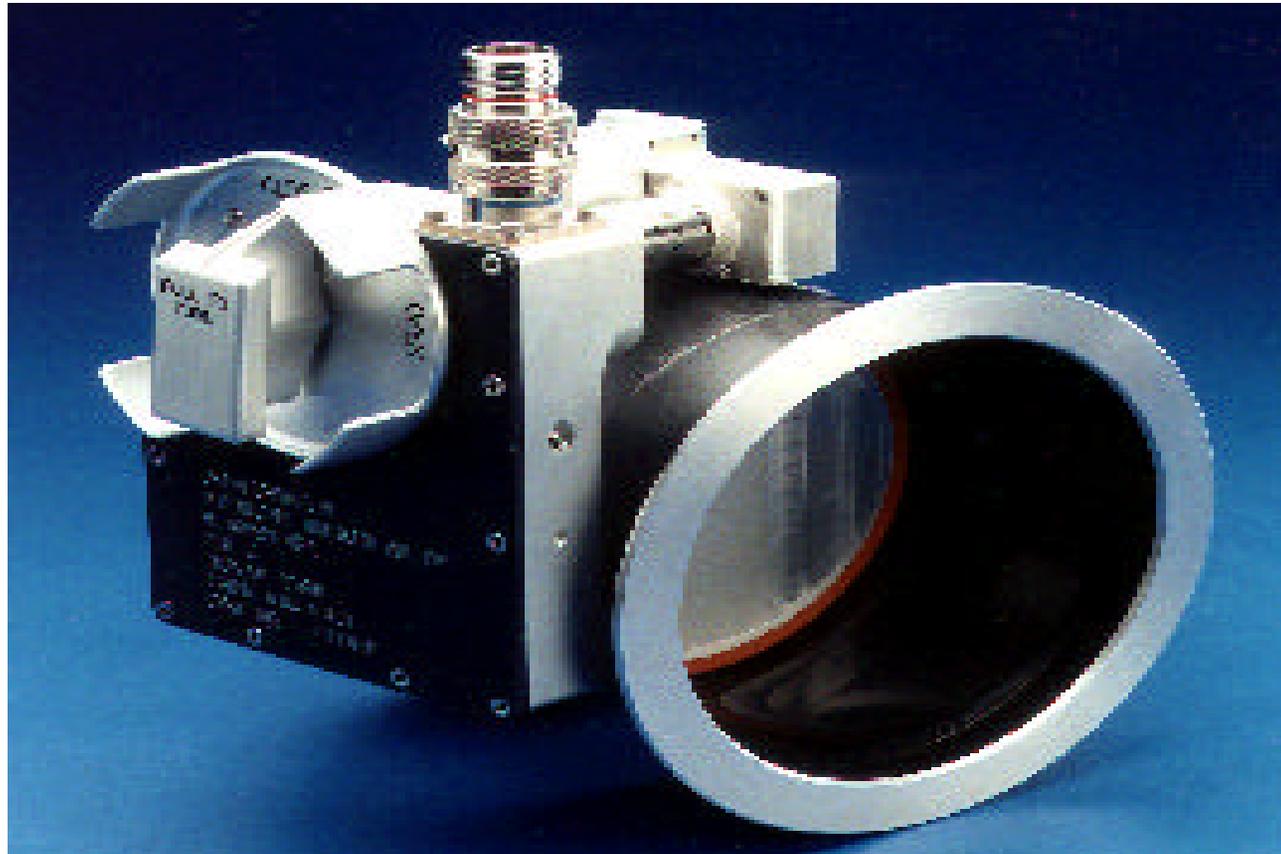


- Observation - PRACA 2331
 - Both (supply and return) IMV valves failed leak test during post 5A.1/pre 7A.1 ground testing
- Discussion
 - IMV valve SN007 (supply) was re-cleaned and reinstalled and passed leak test
 - IMV valve SN008 (return) was replaced with spare which passed leak test
 - Root cause of all MPLM IMV Valve failures experienced thus far (which cannot be attributed to contamination) is insufficient seal compression coupled with normal compression set
- Risk assessment: low
 - If valves subject to contamination on orbit, will not impact nominal IMV operations between MPLM and Node 1 - valves nominally open
 - IMV caps provide seal redundancy for MPLM return to ground
 - In case of fire, depress, or contamination event, IMV valves still provide necessary MPLM isolation at failed leak rates.
- Acceptable for Flight: yes
 - Valves installed in FM-1 for 7A.1 have passed leak test
- Status: open
 - PRACA remains open through UF1 to assess contamination effects on hardware performance



MPLM IMV Valve Leak Test Failures

PRACA 2331





Node 1 Fire Response During Campout

John Lewis



Node 1 Fire Response During Campout Airlock Emergency Response



- Observation:
 - A Node 1 Fire during Airlock Campout configuration requires four commands of the PCS to open the IMVs instead of an automatic response (as designed).
- Discussion:
 - Background:
 - During the Campout configuration, the INTSYS software is designed to open the Node 1 Starboard IMV valves to equalize pressures with the Airlock in a Class 1 Depress Emergency. Unless fire is detected in Node 1.
 - In the event of a Node 1 Fire, the INTSYS software isolates Node 1 IMV valves. This command overrides any commands to open the IMV valves until the isolation is released.
 - This fire isolation is required to prevent opening Node 1 (at 14.7psia) into A/L (at 10.2 & 30% O₂) during a Node 1 Fire event
 - In the event of a Node 1 Fire, four commands on a PCS would be required to open a Node 1 IMV valve to equalize for crew Airlock egress
 - Node 1 has very little powered equipment and little to catch on fire.



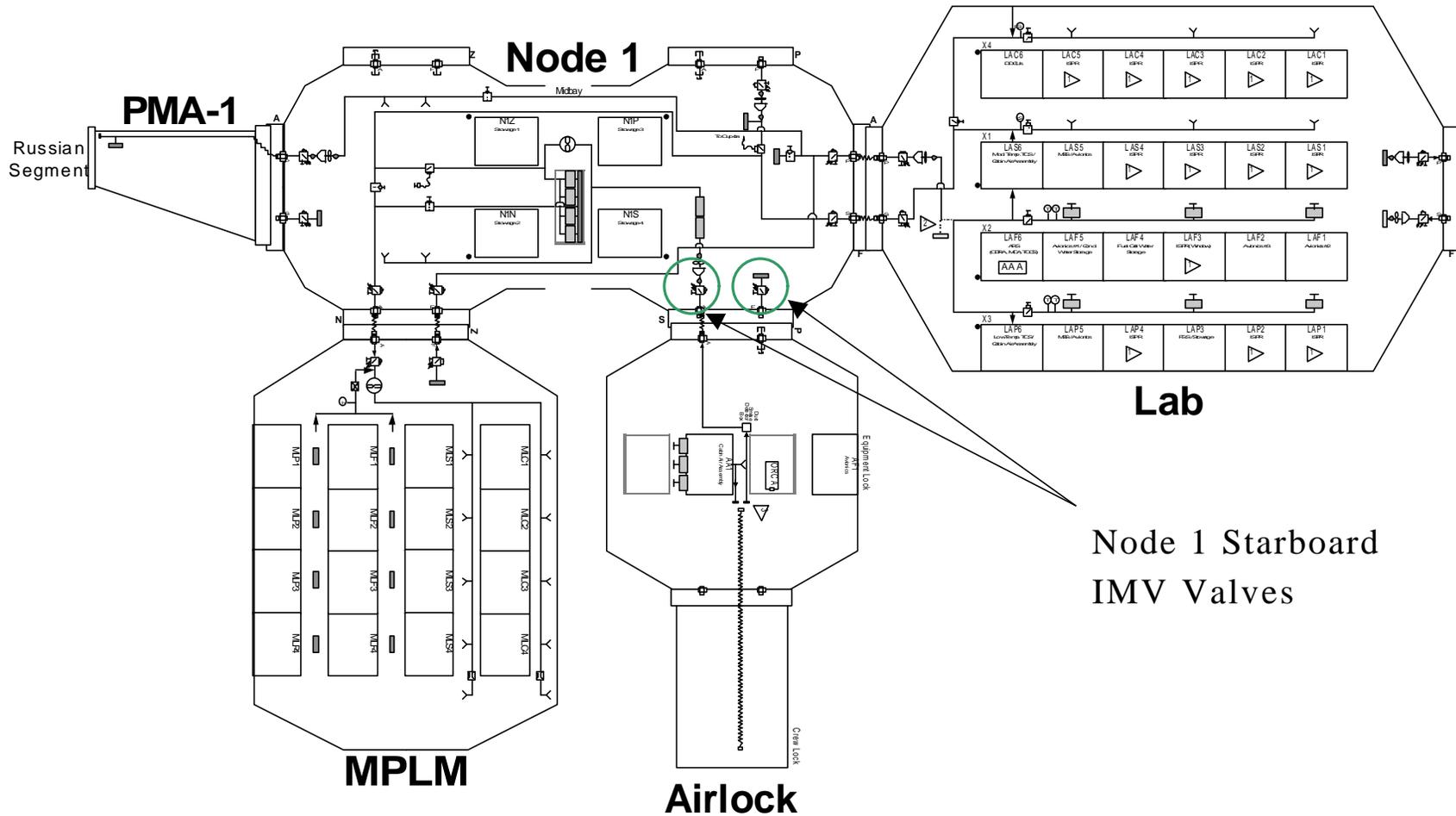
Node 1 Fire Response During Campout Airlock Emergency Response



- Discussion (Continued):
 - Impact:
 - Change to modify C&C PPL to include the Release Node 1 Isolation commands after execution which will allow the Node 1 Starboard IMV valves to open with fewer commands.
 - Operational workarounds exist.
 - 4 PCS commands to release the Isolation status and open the IMV valves accompanied with crew safety training immediately prior to campout (Stage EVAs, 3 Crew)
 - Crew external to the Airlock can open the Node 1 Starboard IMV valves to release the EVA crew. (Shuttle present)
 - Hatch Manual Pressure Equalization Valve (MPEV) can equalize A/L with Node 1 in ~9 minutes compared to IMV valve which can equalize in ~12 seconds.
- Risk assessment: Low
 - Operational Workarounds exist.
- Acceptable for Flight: Yes
 - Operational Workarounds are documented in flight procedures
 - SRP Determining requirement for PPL- Not required for 7A.1, potentially required for Stage EVA
 - If a stage EVA becomes required, ASCB will process PPL
- Status: Open
 - PR 21470 to JSRP--7/31, ASCB--8/1



Node 1 Fire Response During Campout Airlock Emergency Response





MPLM PFE Hazard Analysis

John Lewis



MPLM Portable Fire Extinguisher Stowage



- Observation:
 - A Portable Fire Extinguisher (PFE) is currently stowed in the MPLM for the 7A.1 mission
- Discussion:
 - Failure of a PFE releasing CO₂ coupled with failure of 1 of 3 Positive Pressure Relief Assemblies (PPRA) would cause the MPLM to exceed its MDP of 15.2 psia by < 0.05 psia (0.33%) –not a concern to Structures.
 - All pressurized elements in the ISS program are proof tested to 1.5 times atmospheric pressure
 - The PFE tank is a Leak-before-Burst design and therefore, the only credible leak is a leak or discharge through the main discharge valve. The PFE handle has a locking pip-pin and would prevent the actuation valve from opening inadvertently during launch
- Risk Assessment - Low
 - The only credible failures that could result in a significant PFE flow would be a seal failure which is highly unlikely. There are no other credible failures that can lead to an inadvertent discharge.
- Acceptable for Flight: yes
 - Hazard analysis approved with respect to PFE stowed to launch in a MPLM
- Status: Closed



MPLM CBM Corrosion

Jon Holladay

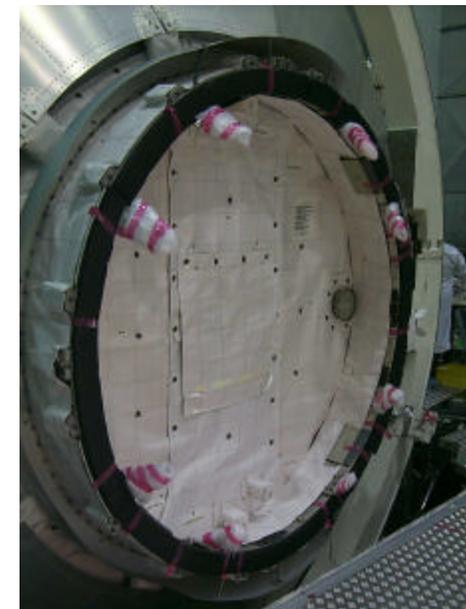


Special Topic

FM-1 CBM Corrosion



- Observation
 - Passive CBM installed on FM-1 exhibited corrosion, likely due to off-gas of the CBM GSE soft cover - CBM repaired and successfully flown on 5A.1
- Discussion
 - Visual inspections/recordings, defects mapped corrosion, epoxy, and scratches
- Risk assessment: low
 - Repair completed to mitigate problem
 - Insure that corrosion does NOT continue
 - Standoff fasteners are verified to specification
 - Leak test (G1138) performed (6/18-21/01) after installation of light seal
 - Powered bolt nuts replaced
- Acceptable for Flight: yes
 - Risk reduced by repair activity and sampling of fastener integrity
 - FM-1 repaired and flown on Flight 5A.1
 - Contamination removed and structural fastener failure risk eliminated by replacement of 5 powered bolt nuts exhibiting corrosion
- Status:
 - Anomaly investigation for lessons learned completed (TBD)
 - Post flight rework for return to specification after 7A.1



**Passive CBM Installed
on MPLM FM-3**



FM-1 CBM Corrosion



- Risk assessment: low
 - Repair completed to mitigate problem
 - Insure that corrosion does NOT continue
 - Standoff fasteners are verified to specification
 - Leak test (G1138) performed (6/18-21/01) after installation of flight seal
 - Powered bolt nuts replaced
- Acceptable for Flight: yes
 - Risk reduced by repair activity and sampling of fastener integrity
 - FM-1 repaired and flown on Flight 5A.1
 - Contamination removed and structural fastener failure risk eliminated by replacement of 5 powered bolt nuts exhibiting corrosion
- Status:
 - Anomaly investigation for lessons learned completed (TBD)
 - Post flight rework for return to specification after 7A.1



Avionics & Software Office

NASA and Boeing

7A.1 Flight Readiness Review

Bill Panter - NASA
Peggy Thomas - Boeing



August 1, 2001



Communication and Tracking (S-Band, Ku Band, UHF/VHF, Audio Video)



- **Hardware being deployed**
 - One Video Tape Recorder (qualification unit) and Two Tape Cleaning Units
 - One Medium Communications Outage Recorder (MCOR) consisting of a laptop and docking station
- **On-orbit status**
 - Video Tape Recorder - The two VTRs on-orbit have failed
 - Status: Investigation in work
 - Impact: Video can be recorded using the Shuttle VTRs. Video to ground can be accomplished during communications with Ku-Band or through the use of a Camcorder by a crew member
 - Drives are life limited and will be turned OFF when not in use
 - MCOR is operating normally and 2 IFIs are under investigation
- **Forward work**
 - Certification of Tape Cleaning Unit
 - Delivery of VTR and Tape Cleaning Unit to KSC – ECD 8/2/01



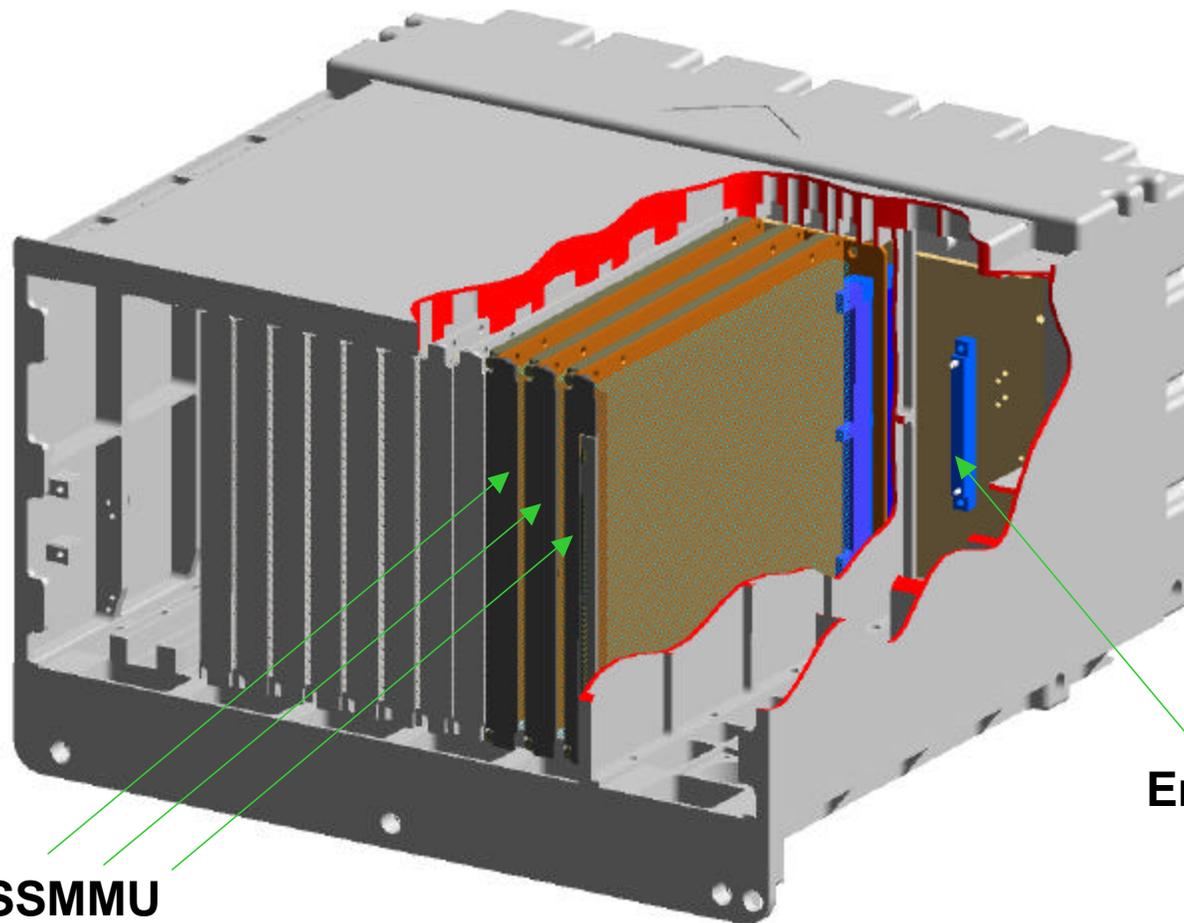
Command and Data Handling



- **Deploying mass storage replacement units to mitigate problems experienced on 6A**
 - One Spare C&C MDM loaded with a Disk Drive Cartridge (DDC), all flight DDC units will now be on-orbit
 - Two Solid State Mass Memory Units (SSMMU) with yellow tags
 - One loaded with Payload Executive Processor
 - One loaded with Command and Control software
 - One unique installation tool for the SSMMU Daughterboard
- **SSMMU Implementation approach is phased with checkpoints after each upgrade**
 - Installation begins at the completion of ground SW testing in September
 - Upgrade Payload-2 MDM
 - Upgrade backup Command and Control MDM and operate as primary MDM during non-critical periods
 - Remaining flight compliment of SSMMUs will be launched on UF1
 - Hardware testing completed



Enhanced Multiplexer Demultiplexer with Solid State Mass Memory Unit



SSMMU
Circuit Card Assemblies (CCA's)
Replaces existing
CCAs

Empty DDC
Slot

ISS-C-4



Solid State Mass Memory Unit Testing



	<u>Qualification</u>	<u>Acceptance</u>
• Full functional test	X	X
• Thermal cycles	24 cycles	8 cycles
• Vibration	3 axes, 240 sec/axis	3 axes, 60 sec/axis
• EMI (analysis)	X	
• Shock by similarity	X	
• Burn in		300 hours
• Honeywell Stress Testing – ECD 8/24/01		
– Worst case SX bus traffic and SCSI bus traffic in parallel		
– SSMMU performance for long duration		
• Software Integration – ECD 9/21/01		
– CCS and PEP interface transparency		
– Off nominal unit testing		
• Hardware Software Integration (HSI) Testing – ECD 9/21/01		
– Focused System level tests		



Solid State Mass Memory Unit Testing (Con't.)



- **Upon completion of the confidence testing**
 - ASCB will review the results and decide if the SSMMU is ready for installation
 - Incremental Mission Management Team (IMMT) will review the ASCB recommendation
 - Results will be formally communicated to the Flight Control Team by CHIT and CR processed
 - Removal of Yellow Tags and begin installation
- **Risk assessment- LOW**
 - Hardware testing already complete
 - Any problems found during HSI testing will be resolved via software or firmware updates and uplinked



Russian Software Upgrade



- **Supports the activation of the Docking Compartment (4R) and the interface to CCS R2 and GN&C R2 (8A)**
 - Software has been supplied to NASA (MBF) and flight copies have been provided to MOD for installation in the Standard Flight CD Case for 7A.1
 - New software will be installed in the Russian C&C, GN&C, and Control Post computers
- **4R stage test at SCTF have been completed**
- **Agreements call for software to be loaded into Russian computers during docked operations on 7A.1**
 - Plans call for Expedition 3 crew to support this activity
 - Details being worked
 - Procedures have been agreed to between US and Russian Teams
 - Final 4-Box Tests in Moscow completed 7/30/01
- **New software will be included in the planned 8A stage tests**



Guidance Navigation and Control

CMG 2 Outer Gimbal Bias Error



- Detailed post-flight data analysis has revealed the presence of a bias in the angular position reported of CMG 2's outer gimbal
- This can be thought of as resulting in a decrease in efficiency of momentum usage
 - Bias appeared ~10 days after 5A undock. Between Day 61 & 71, bias went from 4 to 18 degrees. Bias has been relatively stable since
 - No change in bias seen over the last few weeks
- The combined GN&C/NASA/Sub-Contractor team is investigating
 - Investigation is still preliminary but is tending to a mechanical explanation
 - On-orbit tests have shown that only CMG-2 has a problem
- There is no safety impact to the CMG or the vehicle
 - ISS is controllable till 12A on 3 CMGs without prop assist
- 7A GN&C performance has been as expected in the presence of the bias
 - No impact to 7A operations, none expected for 7A.1



7A.1 Integrated Flight Load Summary and Software Uplink Plan



- **MPLM Software Release 4.5**
 - Update to the Passive MPLM software
 - Fixes 5 PR's
- **Integrated Flight Load consists of 7A Flight load plus**
 - 12 various CSCI related items (CCS, PEP, CSA-Robotics)
 - 6 Telemetry format Propositioned Loads (PPL's)
 - 1 Emergency Caution and Warning ECW PPL
 - 1 Survival Mode Transition command Sequence
 - 2 Core Avionics APID Tables
 - 1 PV FDIR Limits and associated checksum



Operations Support and Laboratories



- **Software Development and Integration Lab (SDIL)**
 - Lab configuration and staffing will be in place to support resolution of in-flight anomalies
- **Mission Evaluation Room (MER) Avionics & Software Support**
 - Staffing
 - Core team consists of Boeing and NASA certified personnel
 - Forward work
 - Final review of deltas to operational procedures and flight rules
 - Shift coverage scheduling
- **Software Development Labs ready for flight support**



Space Station Payloads Office

7A.1

Flight Readiness Review



*Richard Nygren
Manager, Space Station
Payloads Office
August 1, 2001*



7A.1 FRR (8/1/01)

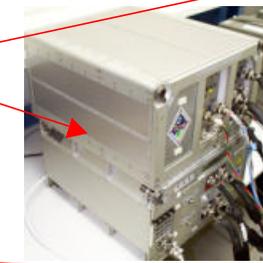
Research Payloads and Utilization Activities



ISS-7A.1 Research Overview

19 NASA research investigations scheduled for 4 disciplines

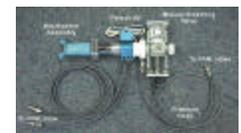
Research Discipline	Continuing	New
MICROGRAVITY RESEARCH		
Cellular Biotechnology Operations Support System (CBOSS)		X
Dynamically Controlled Protein Crystal Growth (DCPCG)		X
Space Acceleration Measurement System II (SAMS-II)	X	
Microgravity Acceleration Measurement System (MAMS)	X	
Experiment Physics of Colloids in Space (EXPPCS)	X	
SPACE PRODUCT DEVELOPMENT (Commercial)		
DREAMTiME		X
CODE M Sponsored		
Advanced Protein Crystallization Facility (APCF)		X
Active Rack Isolation System ISS Characterization Experiment	X	
Materials ISS Experiment (MISSE)		X
Earth Knowledge Acquired by Middle Schools (EarthKAM)	X	
Crew Earth Observation (CEO)	X	
HUMAN LIFE SCIENCES		
Human Research Facility (HRF)	X	
Bonner Ball Neutron Detector (BBND)	X	
Renal Stone Risk During Spaceflight		X
Hoffman Reflex (H-Reflex)	X	
Pulmonary Function (PuFF)		X
Interactions	X	
Xenon 1 (pre & post flight only)		X
Surgical Bone (pre & post flight only)		X



Bio Specimen Temp. Controller



Biotechnology Refrigerator



PuFF Hardware



Increment 3 NASA Payloads and Experiments

Code M

Externally Mounted Payload **Materials ISS Experiment (MISSE)**

RESEARCH OBJECTIVES

MISSE is designed to passively collect data on materials exposed to the space environment related to contamination and material degradation during the Solar Maximum period. Approximately 1500 samples are to be exposed, consisting of switches, sensors, and mirrors, polymers, coatings, composites and biological materials as seeds, spores and bacteria. It is desired that the materials be exposed to space for at least one year.

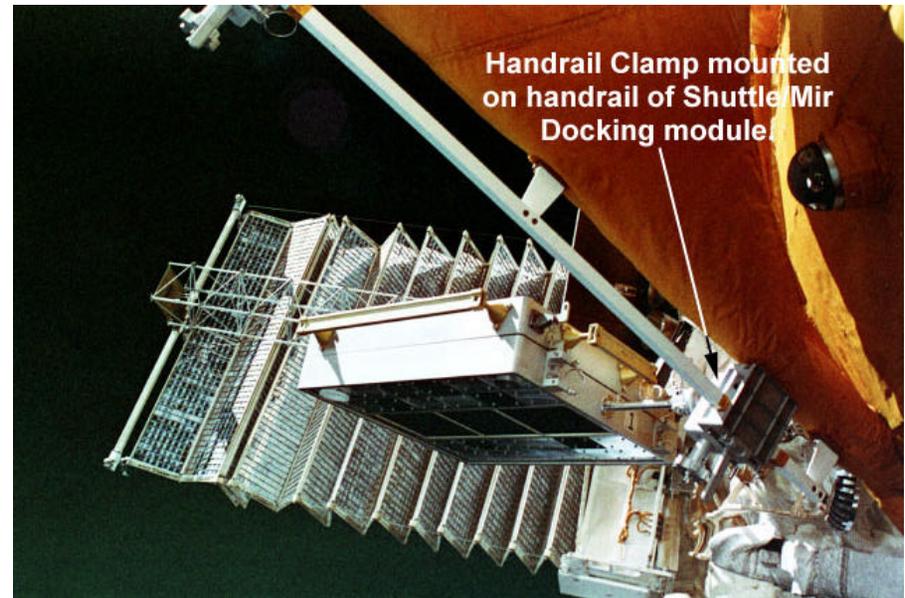
HARDWARE DESCRIPTION

MISSE hardware consists of 2 Passive Experiment Carriers (PECs) and unique PEC handrail clamp/pointer assemblies.

FLIGHT OPERATIONS SUMMARY

The STS crew will perform an EVA to install and deploy the PECs externally on the ISS. One PEC will be installed on an Airlock end cone handrail; the other PEC will be installed on an High Pressure Gas Tank handrail. One PEC will be oriented in the ISS ram direction; the other will be oriented in the wake direction.

PD: Junilla Applin/LaRC



Typical Material Specimen Arrangement in PEC



Clamp/Pointer Assembly



7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



STS-105 Payload Highlights

- **3 Shuttle middeck continuously powered payloads to be operated**
- **3 additional payload/experiments to be operated during the mission**
- **First external ISS payload, Materials ISS Experiment (MISSE), to be deployed via EVA**
- **First use of NASA, DREAMTiME Holdings partnership hardware on ISS**
- **2 new EXPRESS racks (#4 & #5) to be transferred to the ISS**

Ascent

Manifest

- Middeck: DCPCG, Biotech Refrigerator including bio samples, APCF, HRF items, DREAMTiME camcorder; 7 MLEs, 176 kgs
- MPLM: EXPRESS racks #4 & #5, DREAMTiME support items, EXPRESS rack stowage/spare items, spare MCOR, MISSE clamp/pointer assemblies; 5 CTBEs, 249 kgs
- Payload Bay: 2 MISSE Passive Experiment Carriers on ICC

Descent

- Middeck: Commercial Protein Crystal Growth, Protein Crystal Growth Dewar, HLS Phantom Torso, Passive Dosimeters; 6 MLEs, 171 kgs
- MPLM: MACE-II, EXPPCS data disks, HLS support hardware; 7 CTBEs, 209 kgs



7A.1 FRR (8/1/01)

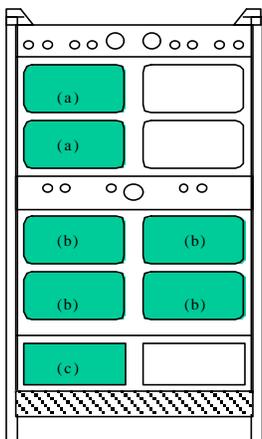
Research Payloads and Utilization Activities



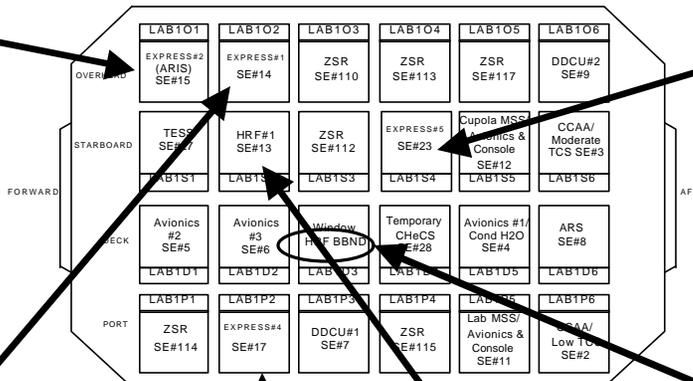
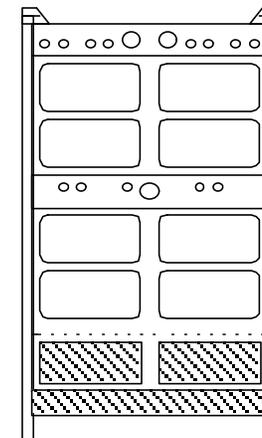
Hardware Location During Stage

ER #2

- a. ARIS-ICE (2)
- b. EXPPCS (4)
- c. SAMS ICU

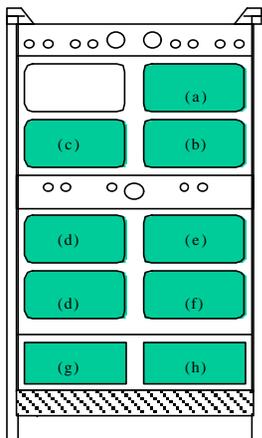


ER #5



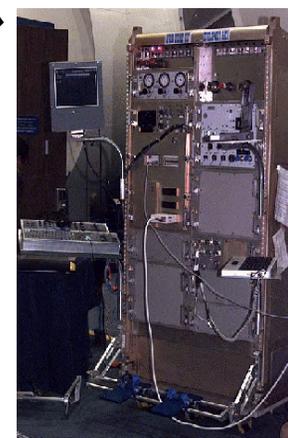
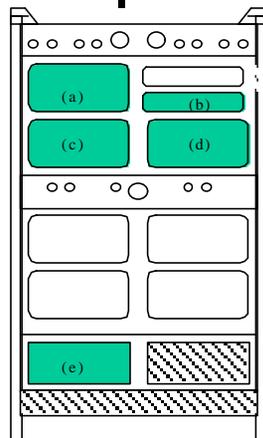
ER #1

- a. APCF
- b. BTR
- c. ADVASC-SS
- d. MAMS (2)
- e. DCPCG-C
- f. DCPCG-V
- g. SAMS-RTS-1
- h. SAMS-RTS-2



ER #4

- a. BSTC
- b. GSM
- c. BCSS-01
- d. BCSS-04
- e. Ku REC



HRF Rack



BBND

Powered
 Payload
 Stowage

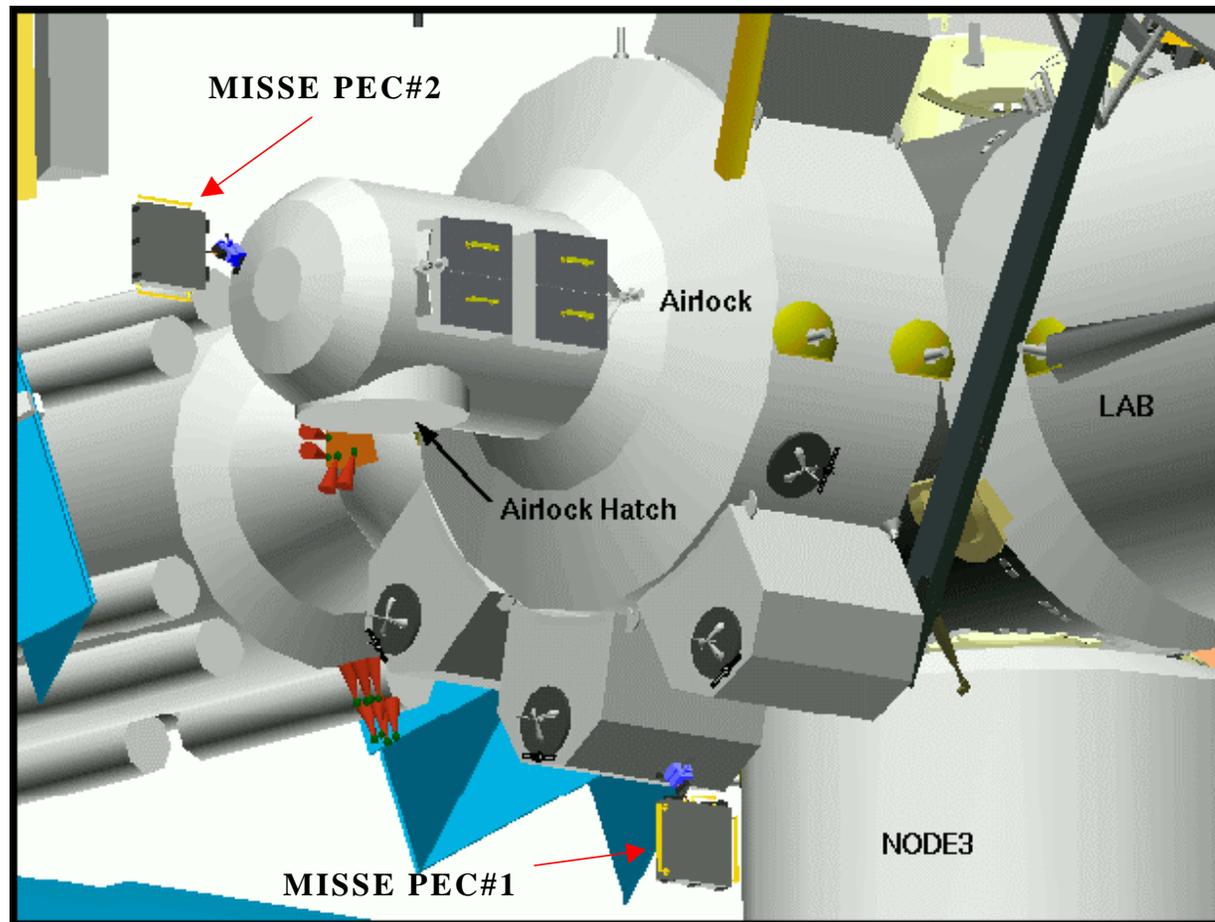


7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



External Payload Location During Stage





7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



EXPRESS Rack Anomalies

Brian Key





7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



EXPRESS Rack Anomalies

- Over the past couple of months, EXPRESS Rack 2 (ER 2) has exhibited anomalies related to transmitting payload data:
 - (1) Payload Ethernet interface becomes unusable
 - (2) ER 2 Rack Interface Controller (RIC) locks-up
- For anomaly 1, Ethernet interface between payload and RIC becomes unusable resulting in the loss of medium rate payload telemetry data
 - Root cause attributed to a Lance Ethernet Driver chip error;
 - Symptoms: Heavy Local Area Network (LAN) loading causes Lance hardware to identify an internal “Restart” condition
- For anomaly 2, ER RIC locks-up resulting in the eventual loss of rack health and status telemetry data; reboot of RIC required
 - Root cause attributed to be an exception concurrent with an interrupt on the Master Controller Card (MCC) leading to a card reboot
 - Symptoms: Heavy Ethernet LAN traffic coupled with high rate of data bridging between payloads within ER 2 and ER 2-to-ER 1 bridging
 - Currently, operational procedures being used to minimize reoccurrence by staggering rack payload operations; reducing simultaneous data sources on a LAN

Brian Key





7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



EXPRESS Rack Anomalies (cont'd)

- Troubleshooting activities at the Payload Software Interface Verification/Facility have recreated the failures
 - Configured payload simulations to provide telemetry data like that of on-orbit data traffic
- Software modifications developed to alleviate the anomalies
 - Up to 4 CD-ROMs desired to be flown up on 7A.1
 - Installation into EXPRESS racks to occur during the Stage, pending completion of Functional Qualification Testing (FQT) of software
- No Impact to Flight; Closure is not a constraint to launch

Brian Key



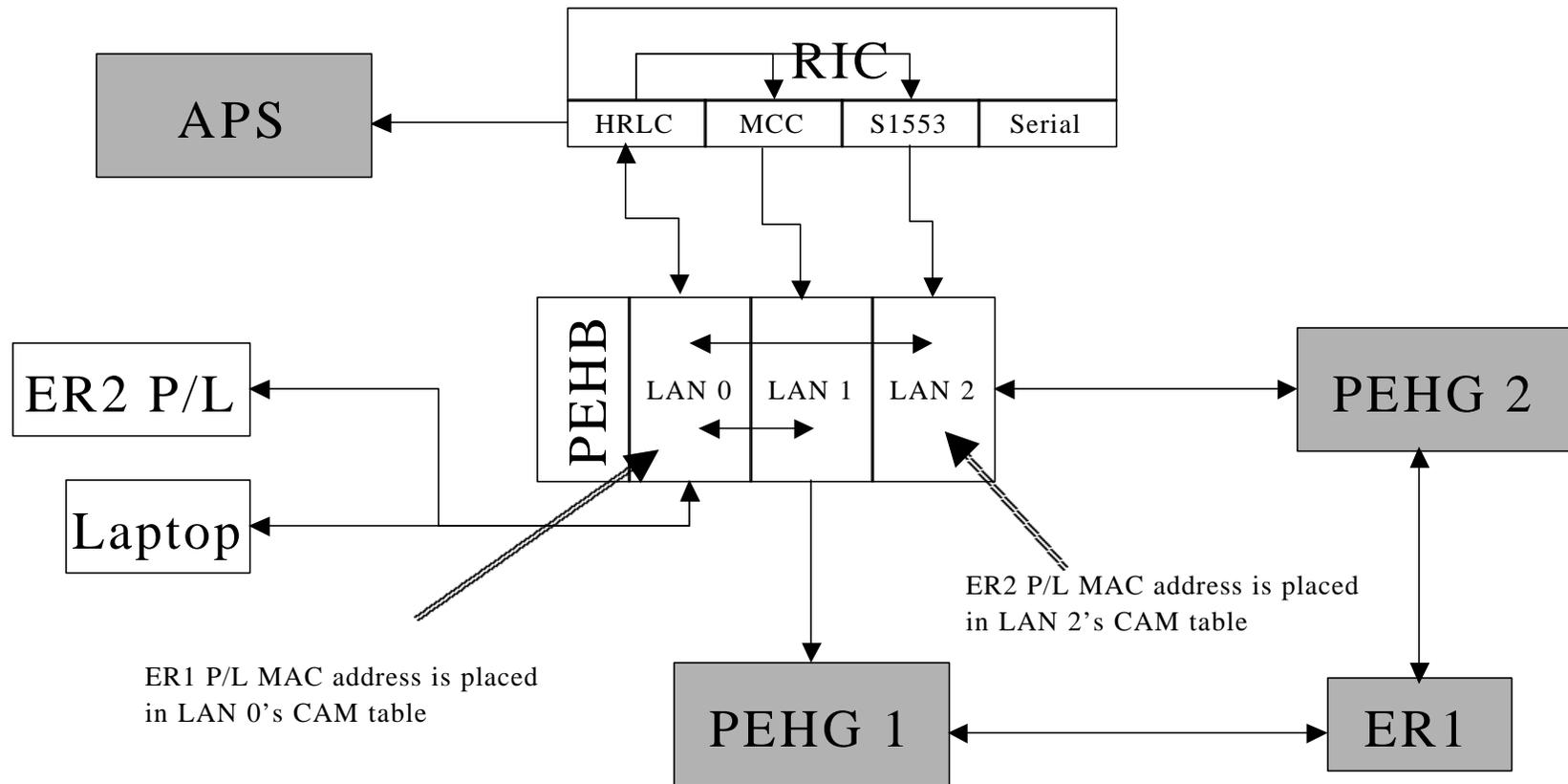


7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



EXPRESS Rack Data Flow



Brian Key





7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



Readiness Statement

Pending completion of the identified normal open work*, the Payloads Office is ready to proceed with the STS-105/7A.1 launch.

**Richard Nygren,
Manager, Space Station Payloads Office**

* Planned items that include nominal pre-flight experiment sample processing, weight/cg measurements, battery charging, middeck powered payload turnover, late stow payload items turnover.



ISS Program Status



- **GFE Office**
 - Analysis and assurance activities are complete.
 - Remaining hardware activities support launch of 7A.1 Flight.
- **ISS Payloads**
 - Manifest and timeline supports research objectives for the flight and delivery of hardware for the stage.
 - ISS Payload is go and ready to support the 7A.1 Flight.
- **Management Integration Office/Configuration Management**
 - All approved changes, including waivers and exceptions have been verified for incorporation into the baseline.
 - MIO/CM is ready to support the 7A.1 flight.

*7A.1 FRR – 08/01/01
Sharon Castle/LPM*



ISS Program Status



- **S&MA**
 - All hardware and software certifications are complete or will be complete prior to launch.
 - US and Russian Certification schedules support launch date.

- **Mission Integration and Operations**
 - On-board consumables plus those manifested on Flights 7A.1, 5P, and 4R support the planned 120-day Increment +45-day skip cycle.

- **Program Integration Office**
 - Program Integration has no constraints to the 7A.1 Launch.
 - Prop, altitude, and power balance all have positive margins.
 - MPLM launch/landing loads analysis is acceptable for all mission phases (return constraints defined; multiple cases analyzed with positive margins).
 - EAS Grapple Fixture/Adapter load exceedance resolved—SORR exception closed.
 - SSRMS/CSA is ready to support Mission/Stage requirements.
 - RSA is ready to support Mission/Stage requirements.

*7A.1 FRR – 08/01/01
Sharon Castle/LPM*



7A.1 Flight Summary



- **Flight objectives and priorities are defined.**
- **Flight manifest has been defined.**
- **All hardware and software certifications are complete or will be complete prior to L-2 days.**
- **Personnel and facilities are ready to support.**
- **Hardware delivery and processing schedule supports launch date.**
- **US and Russian certification schedule supports launch date.**
- **Special topics have been resolved or have acceptable operational workarounds.**

**The ISS Program is ready to proceed with the Launch of
ISS 7A.1/STS-105**

*7A.1 FRR – 08/01/01
Sharon Castle/LPM*



ISS OVERVIEW BACK-UP



BACK-UP CHARTS





ISS OVERVIEW BACK-UP



Priority	PART NUMBER	ENGINEERING NAME	QTY	Dimensions	Weight	HARDWARE PROVIDER	NOTES
			UP/ DN	L X W X H (in)	Lbs (each)		
1	8259015-916	MDM	1/0	13.3 x 14.4 x 9.2	51	Larry Barner (281) 336-4750	Repair of CNC MDM returning on 7A and launching as on orbit Spare
2	V669-001014-001	Trash Dispenser Assy	30/0	9" x 2.5" x 5.5"	0.3	KC Chhipwadia	Required for ISS crew use as backup to Russian ECLSS items
3	V669-002062-001	Fecal Bag Assembly	7/0	9" x 2.5" x 5.5"	0.3	KC Chhipwadia	Required for ISS crew use as backup to Russian ECLSS items
4	199C3230G1	Urine Pre Filters	15/0	1.75 x 1.38 x 2.75	0.02	KC Chhipwadia	Required for ISS crew use as backup to Russian ECLSS items
5	683-51020-1	VIDEO TAPE RECORDER	1/1	15.9 x 8.1 x 7.6	15.6	Larry Barner (281) 336-4750	R&R swap with broken one on orbit
6	V8-25CLD	VTR CLEANING TAPE	2/0	TBD (Same as Hi-8 mm Tape)		Larry Barner (281) 336-4750	For VTR Head cleaning
7	SED13101547-308	EMU BATTERY	2/2	5.1 x 12.5 x 3.5	19.7	XA	Additional EMU batteries due to 7A changes (Battery leaking and the inadvertant return of a battery)
8	528-21209-1	28V UTILITY ADAPTER	1/0	1.19 x 1.19 x 3.28	0.5	XA	Missed MPLM stow date
9	SJD13101716-303	LOWER ARM KIT, 12V	2/0	7 x 7 x 5	3.75	XA	Missed MPLM stow date
10	SEG16103274-301	IWIS BATTERIES	4/0	2.9 x 3.9 x 3	6	Brian Rochelle (281)853-1739	Required for IWIS Loads model verification measurments





ISS OVERVIEW BACK-UP



Priority	PART NUMBER	ENGINEERING NAME	QTY	Dimensions	Weight	HARDWARE	NOTES
			UP/ DN	L X W X H (in)	Lbs (each)	PROVIDER	
11 Pending	SEZ12100606-303 SEZ12100606-301	DVD Player Assy	1/1	7.5 x 5.4 x 1.0		Stephanie Walker	Swapping -303 unit with failed unit (-301) on orbit. (Will be presented to PRCB for Launch)
TBD Pending	SED46113528-307 SED46113528-308	SLD (TVIS)	1/1	19.7 x 7.2 x 11.8	25.93	Cathy Dempsey	Anomaly on orbit may require replacement hardware
Return	SEZ39134166-301 SEZ39134156-301	DAT BOX DIGITAL AUDIO TAPE	0/2 0/24	8.1 x 3.1 x 3.1 2.8 x 2.1 x 0.4	0.34 0.05	IMAX	IMAX Audio tapes returning. 12 Tapes in each box.
Return Pending	SEG33113140-303	CONTINGENCY WATER CONTAINER, CWC	0/1			Nigel Packham	Full of Lab condensate
Return	SEG46118278-701	RETURN ZIPLOCK BAG ASSY	0/1	12.0 x 12.0 x 2.0	0.95		Also Called ITCS Samples
Return	SED33111493-301	AVIU	0/1		1.6	MV	-301 did not get returned as part of swap with -302 (Inadvertantly left on ISS)
Return Pending	SEG33105030-301	PBA: O2 HARNESS ASSY OXYGEN CYLINDER	0/3			Jason Dake	PBA's launched on 7A were not filled.





ISS Configuration Management Office

7A.1 FRR



Aug 01 2001

OL/Alan Lindenmoyer
Manager, Configuration Management

ISS-BU-A-4

Configuration
Management



7A.1 FRR Approved Waivers

CHANGE ID	TITLE	CHANGE APPROVAL	REMARKS	FLIGHT EFFECTIVITY
SSCN 4874	Request for Waiver: Early Ammonia Servicer Lost Traceability of Components	1/31/01 VCB	Boeing is requesting a waiver to the requirements of SSP 30695 and SSP 41170 for maintaining hardware traceability for some EAS components.	7A.1
SSCN 4875	Request for Waiver: Early Ammonia Servicer Quick Disconnect (1") Mass Spectrometer Leak Rate	1/29/01 VCB	Request for a waiver to the Quick Disconnect 1F45540-517 S/N 0166, installed on the Early Ammonia Servicer, that failed the leak rate requirement of 1.0×10^{-4} .	7A.1
SSCN 5091R2	Request for Waiver –Uninstalled Parts (Rack Standoffs) for MPLM FM-1	7/20/01 VCB	R1 Boeing PGOE is unable to completely satisfy applicable configuration reconciliation requirements due to lost traceability of lot numbers for Quick Release Pins on the Knee Brace Kit for MPLM racks. The attached waiver form addresses specific parts/hardware. Request waiver approval for "use-as-is" acceptable unrestricted for all flights with the lost traceability condition for the quick release pins, part number 683-60729-1. Posted For ASI Signature.	7A.1
SSCN 5136 R1	Request for Waiver-MPEV CAP REMOVAL Prior to Flight.	7/30/01 VCB	Request waiver to permanently accept the MPEV associated drawings showing the protective cap installed for all MPLM units when in fact the protective caps are removed prior to flight	7A.1 And all Increment 2 Flts
SSCN 5790	Request for Waiver- MPLM FM1 Keel Camera Target Out of Position	7/27/01 VCB-OSB	Request waiver to permanently accept the Keel Camera Target position out of tolerance condition. Posted For ASI Signature.	7A.1



7A.1 FRR Approved Exceptions

CHANGE ID	TITLE	CHANGE AUTH	REMARKS
SSCN 5160	Exception to Early Ammonia Servicer (EAS) Quick Disconnects (QDs) M2, M7, M8, M9 and M10 Extravehicular Activity (EVA) Gloved Hand Clearance.	5/04/01 VSIP	This change adds an exception new requirement (exception to SSP 50005) to the EAS Specification, RJ00342, for section 3.2.4 Maintainability, and a new line item to the Table III, RJ00342 Verification-Cross Reference Matrix.
SSCN 5716	Incorporate PCB Approved Exceptions into MISSE ICD baselined SSP 57244	7/12/01 PCB	Approve and release the following exceptions to the ISSP for incorporation into the baselined SSP 57244,: Materials ISS Experiments (MISSE) Hardware Interface Control Document(ICD).
SSCN 5761	Exception to the Early Ammonia Servicer (EAS), RJ00342, for the Extravehicular Robotics (EVR) interfaces with the Flight Releasable Grapple Fixture (FRGF	7/30/01 VSIP	The structural design of the interface between the ESA FRGF, EAS Remote Manipulator System (RMS) adapter plate, and EAS top cover does not meet the required load cases as stated in NSTS-21000-ISS-IDD, paragraph 14.4.5.1. This change updates paragraph 3.2.4.5 of the Early Ammonia Servicer On-Orbit Support equipment (OSE) specification (RJ00342) to document an exception to the invoked requirement.



7A.1 FRR Pending Changes

CHANGE ID	TITLE	CHANGE AUTH	REMARKS
SSCN 3379	Baseline SSP 54103-ANX 2, Increment Definition and Requirements Document (IDRD) for Planning Period 3, Annex 2: On Orbit Maintenance Plan	Pending MIOCB	Change is written to baseline SSP54103-ANX 2, IDRD for PP3, Annex 2 ; On Orbit Maintenance Plan.
SSCN 3797	Revise SSP 54103, IDRD for Planning Period 3 to Revision A to Incorporate Increment 4	Pending (NASA app 4/25/01)	POSTED FOR IP CSA SIGN. This CR provides the Program level requirements for Planning Period 3, covering updates for Increment 3, and resource and utilization requirements for Increment 4 as documented in attachment A.
SSCN 4071	Pump Package Assembly Acoustic Reduction Kit (PARK) - US Lab (683400A)	Pending PICB	This change provides for the development, design, fabrication and delivery of a kit to reduce the acoustic levels of the Lab Module Pump Package Assemblies (PPA). The change will define the design and implementation of the PPA Acoustic Reduction Kit (PARK) as an on-orbit improvement to the LAB acoustic environment. The following will be accomplished via this change:
SCN 4636	Update SSP 54103-07A.1, Increment Definition and Requirements Document (IDRD), for Planning Period 3 (PP3), Annex 1: Station Manifest, Flight 7A.1 (STS-105)	Pending NASA App.11/28/00 MIOCB	POSTED FOR IP RSA Signature. Update the manifest with the attached tables (Attachment A). The manifest request included are: 00-10-59 Add SO LTA Cables, 00-10-81 Update Russian Hardware on ICC, 00-10-94 Orlan SAFER Prop Bottles, 00-10-96 Move BMRRM from Candidates List to Middeck, 00-10-97 Add Crew Provisions, and 00-10-98 Add TMA Seat Liners.
SSCN 4667	Solid State Modification for Flight ESSMDMs	Pending ASCB	This change modifies the solid state mass memory upgrade procured under SSCN 1847 to the ESSMDM.
SSCN 4885	Update SSP54103-07A.1, Increment Definition and Requirements Document (IDRD), for Planning Period 3 (PP3), Annex 1: Station Manifest, Flight 7A.1 (STS-105).	Pending MIOCB NASA app 1/23/00	POSTED FOR IP RSA Signature. Update the Flight 7A.1 manifest in support of stowage drawing release. *DCN 004 has been Early Released.
SSCN 5230	Update SSP 54103-07A.1, Increment Definition and Requirements Document (IDRD), for Planning Period 3 (PP3), Annex 1: Station Manifest, Flight 7A.1 (STS-105) in support of KSC MPLM Bench Review.	Pending NASA App. 5/15/01 MIOCB	POSTED FOR IP RSA Signature. Update the manifest To update the Flight 7A.1 manifest in support of the KSC Bench Review on 03/15/01



7A.1 FRR Pending Changes

CHANGE ID	TITLE	CHANGE AUTH	REMARKS
SSCN 5638	Incorporation of approved standard MDM utilities SCRS	Pending-PCB NASA app 6/15/01	POSTED FOR IP CSA, RSA Signature. Update the Flight 7A.1 manifest in support of stowage drawing release dates.
SSCN 5642 R1	MCOR Design Change	Pending ASCB	This change authorizes a post-SAR hardware modification to the GFE MCOR assembly SEG46117284 to eliminate the unexpected thermal inducted shutdown anomaly. This change will force the cooling fan to operate at high speed constantly. The GFE part number will rolled to a-303.
SSCN 5683	Revise to Revision A, SSP 54103-ANNX2, Increment Definition and Requirements Document (IDRD) for Planning Period 3, Annex 2: On-Orbit Maintenance Plan	Pending MIOCB	This request is submitted to revise SSP54103-ANX 2 to Revision A. This Revision A will capture launch dates changes identified in Assembly Sequence F.
SSCN 5741	Create New Envelope Drawing 683-57251 to Procure New High Pressure Hose	Pending VSIP	Create new Envelope Drawing 683-57251. This drawing will replace Source Control Drawing 683-56001. New Drawing will allow the identification of suppliers that can supply hoses that can meet the ISS Program Qualification Burst Test Requirement.



7A.1 CM SORR Open Work

ITEM ID	TITLE/DESCRIPTION	PLAN TO RESOLVE/CLOSE	RESPONSIBLE ORGANIZATION/ ACTIONEE	ECD	RISK TO FLIGHT
6A-CM-S-001	MANIFEST ACCOUNTING ACTIVITIES AND DOCUMENTATION	COMPLETE VERIFICATION	BOEING-KSC/S. TOWNSEND	8/07/01	LOW
6A-CM-S-002	AS-DESIGN/AS-BUILT RECONCILIATION OF HARDWARE/SOFTWARE	COMPLETE VERIFICATION	BOEING/FRED GOFF	7/21/01	LOW
6A-CM-S-003	VERIFICATION OF ISS ON-ORBIT CONFIGURATION	DISPOSITION THE OPEN ITEMS	BOEING-KSC/S. TOWNSEND	8/07/01	LOW



7A.1 CoFR Certification Results

- All 7A.1 approved changes since CoFR including waivers, deviations, and exceptions, have been identified and incorporated.
- The 7A.1 as-built configuration has been reconciled with the as-designed baseline (except as noted).
- 7A.1 open work has been identified and will be tracked to closure.



Vehicle Office

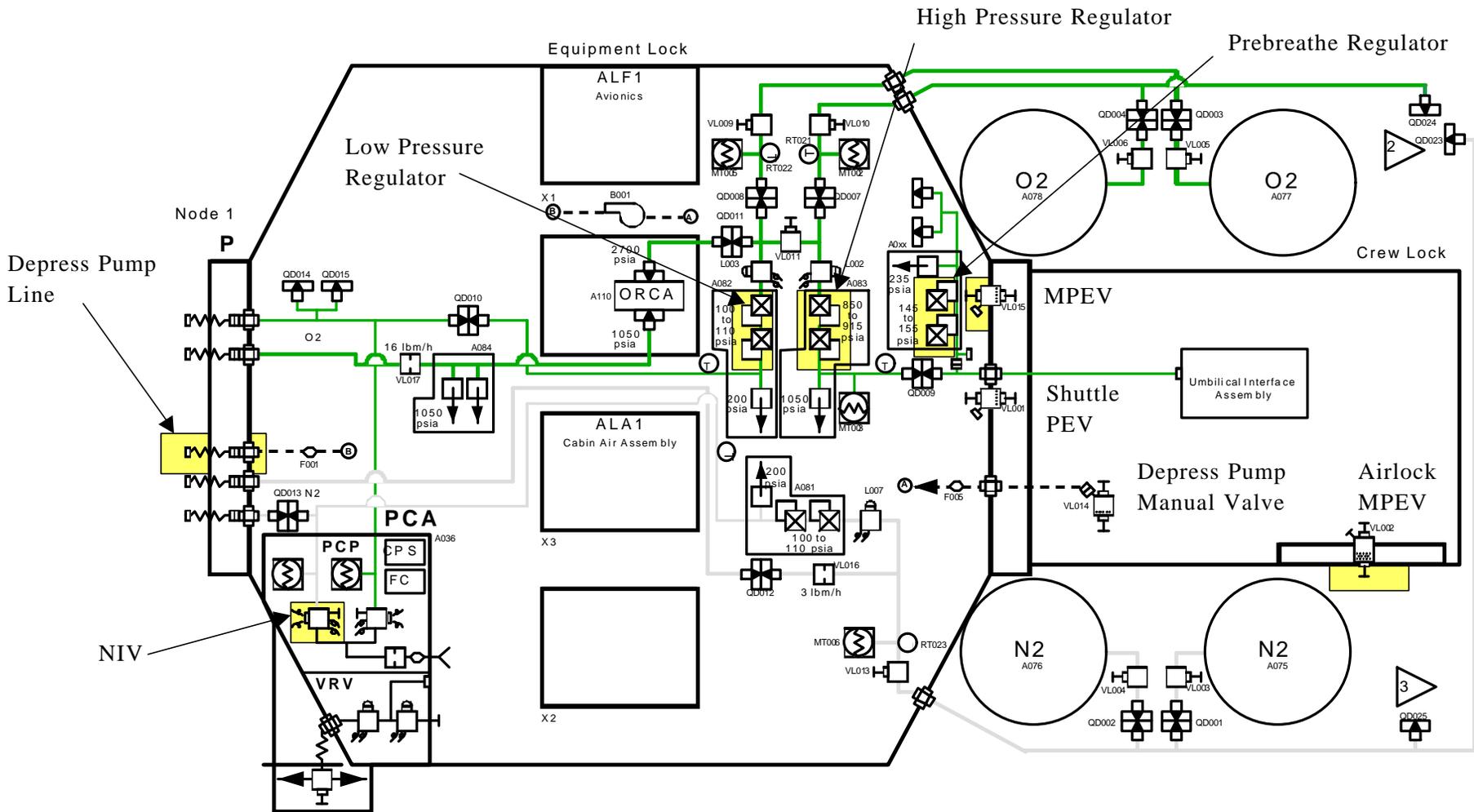


BACK UP CHARTS



Airlock

ECLS - Atmosphere Control & Supply





Current On-Orbit Status



C&DH

- All Station MDMs operating
 - Node - N1-2 primary, N1-1 secondary
 - Photovoltaic Control Unit (PVCU) - 2B backup, 4B primary
 - FGB - 2 on, 1 off
 - SM - Loaded with version 5.0 software
 - SMTCs - 2 of 3 in redundant set
 - SMCCs - all in redundant set
 - Lab
 - C&C 1 backup, C&C 2 standby, C&C 3 primary
 - INT systems 1 operating, INT systems 2 off
 - Lab Aft 1, 2, 3 operating
 - Power Management Controller Unit (PMCU) 1 off, PMCU 2 on
 - GNC 1 backup, GNC 2 primary
 - Payload 1 primary, PL 2 unpowered (awaiting activation and c/o)
 - Airlock MDM - operating



Current On-Orbit Status (continued)



C&T

- Early communications system deactivated
- S-band high/low data rate operating nominally
- SM Regul System operating on 1 of 3 strings
 - Failed strings removed
 - One string replaced unit on 7A
 - New unit exhibiting same problems as old unit
- Audio system
 - Internal Audio Controller (IAC) 1 active, IAC-2 off



Current On-Orbit Status (continued)



ECLS

- Various small leaks in the airlock
 - 2 O₂ systems leaks
 - N₂ system leak
- Lab ECLS systems operating nominally except for the CDRA
 - CDRA operating single-bed (when required)
- Node smoke detector #2 disabled
- SM Vozdukh operating on 2 of 3 CO₂ removal beds
 - CO₂ removal capability nominal (occasional fan problems)
 - Spare Vozdukh CO₂ removal bed ORU and fans transferred on 5A Elektron providing oxygen
- Air conditioner #2 (SKV 2) has been repaired but not put into service (both U.S. Lab CCAAs operational)
 - Condensate seen on outside of SKV 2 – Russians assessing
- SM rapid depress response inhibited
 - Low Pressure warning enabled (U.S. Lab rapid depress response enabled)



Current On-Orbit Status (continued)



EPS

- FGB EPS working nominally
 - 6 of 6 batteries operational
- SM EPS working nominally
 - 7 of 8 batteries operational
- P6 power channels 2B and 4B operating nominally
- Plasma Contactor Unit (PCU) 1 and 2 in standby
- RPCMs
 - All performing nominally
 - RPCM LAD22B-A has a bit flip in SRAM - cannot be refreshed



Current On-Orbit Status (continued)



S&M

- 3 of 4 Beta Gimbal Assembly (BGA) latching mechanisms locked on starboard 4 Bar assembly
 - Latched port 4 Bar assembly on 5A.1
 - Strength analysis shows 3 of 4 acceptable for near term
- 2B and 4B BGA showing high currents sporadically
- 2B and 4B in rate mode

TCS

- Early External Active Thermal Control System operating within specs
 - Starboard radiator has one loop plumbed incorrectly
 - Heat rejection capability impacted - still meets heat rejection needs
- ITCS operating nominally
 - Gas trap on MTL R&R complete
 - Delta pressures across trap back to normal



Current On-Orbit Status (continued)



EVR

- MSS Racks 1 and 2 installed
 - RWS equipment configured
 - Jumper installed to patch around UOP-trip issues
- CanadArm2 operating with Operational Patch #1
 - Ops Patch #1 masks JEU 1553 RT_fail flag
 - Ops Patch #2 available if required
 - Masks 1553 RT_fail flag in the LEU, the DCP, and the VDU

GN&C

- CMG 1 and 2 have experienced loss of comm
 - CMG 2 appears to have a bias in the outer gimbal
- Propulsion systems nominal and ready for 7A operations

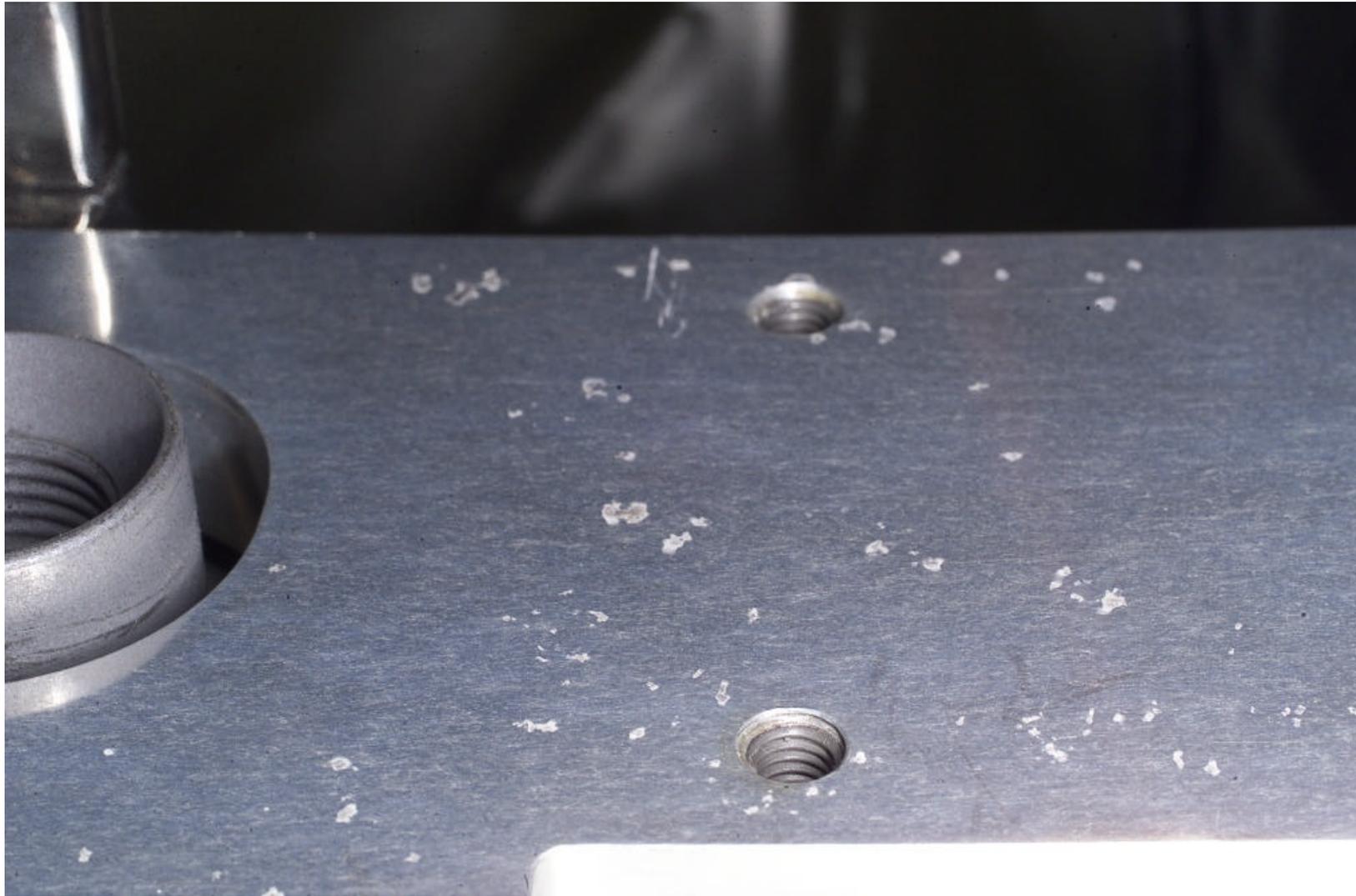
EV&CS

- Blood Pressure Electro-Cardiogram (BP/ECG) and Medical Experiment Computer (MEC) impacted recently by UOP trips



PCBM Ring 683-13480-11

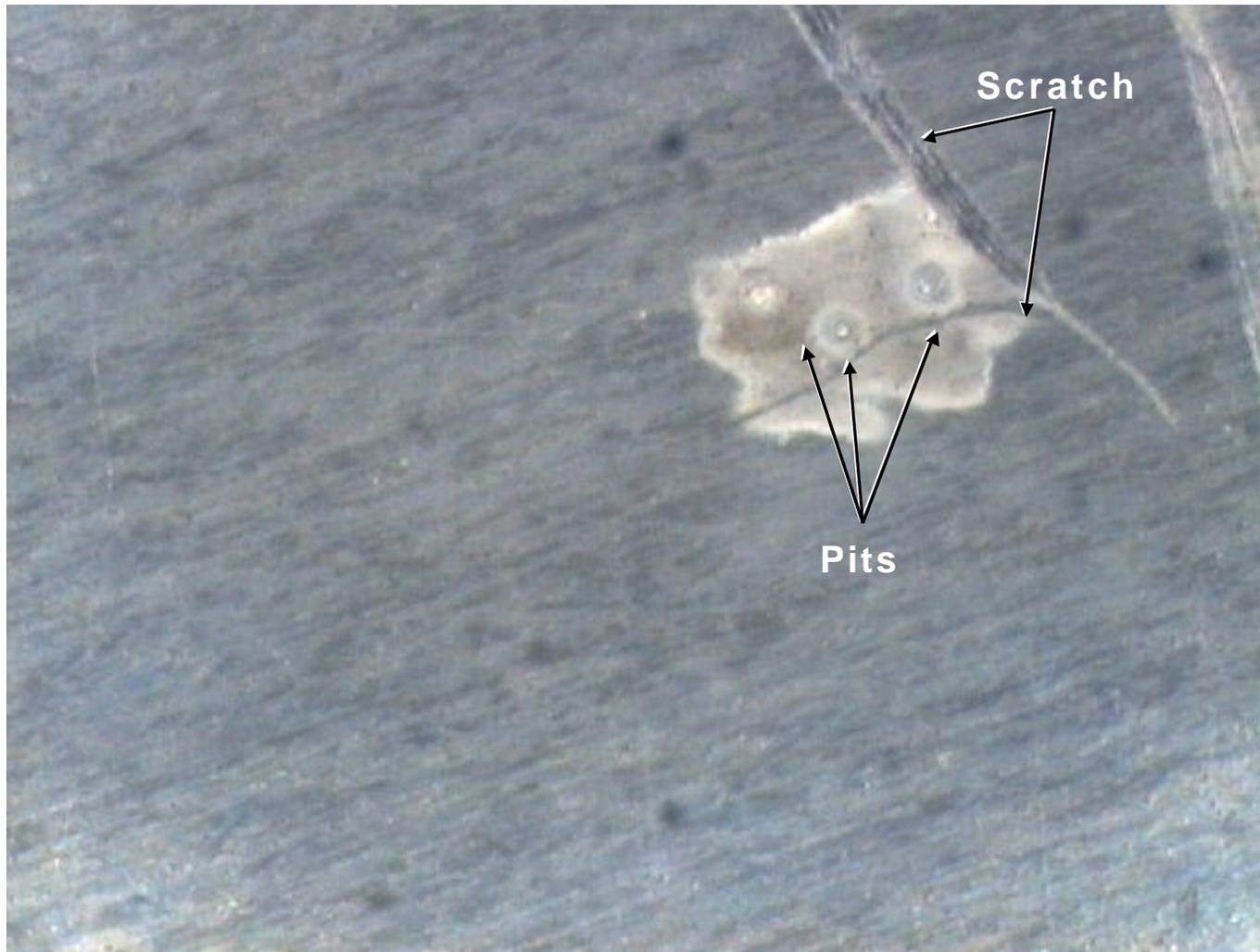
Surface at 8 o'clock position





Corrosion on Ring

Close up showing pits/scratch at 8 o'clock position





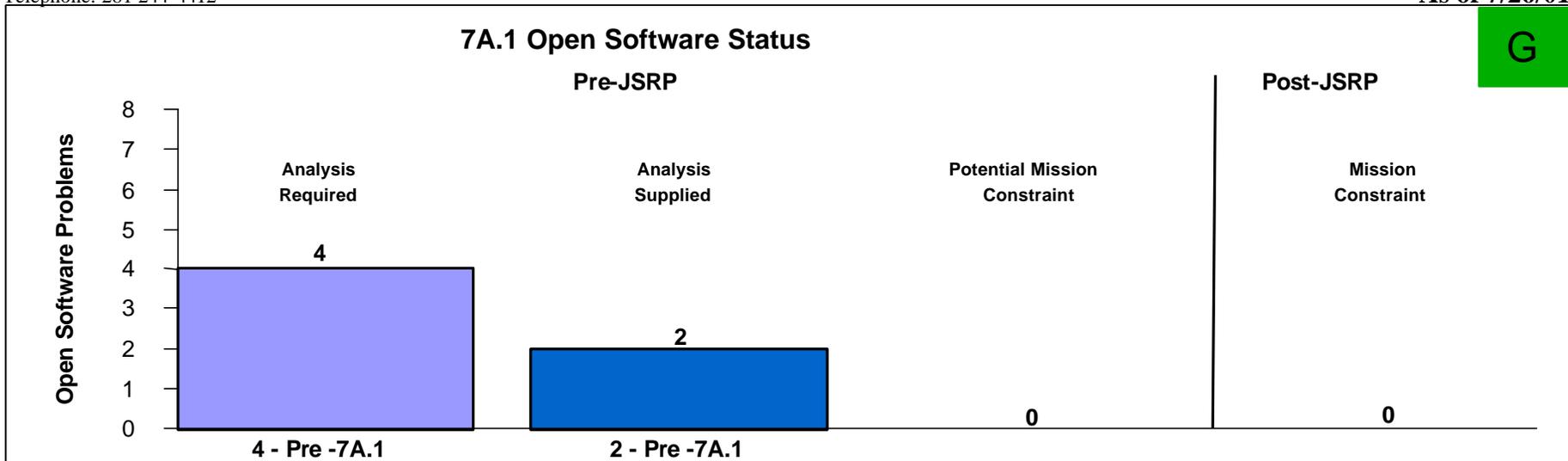
Backup Slides



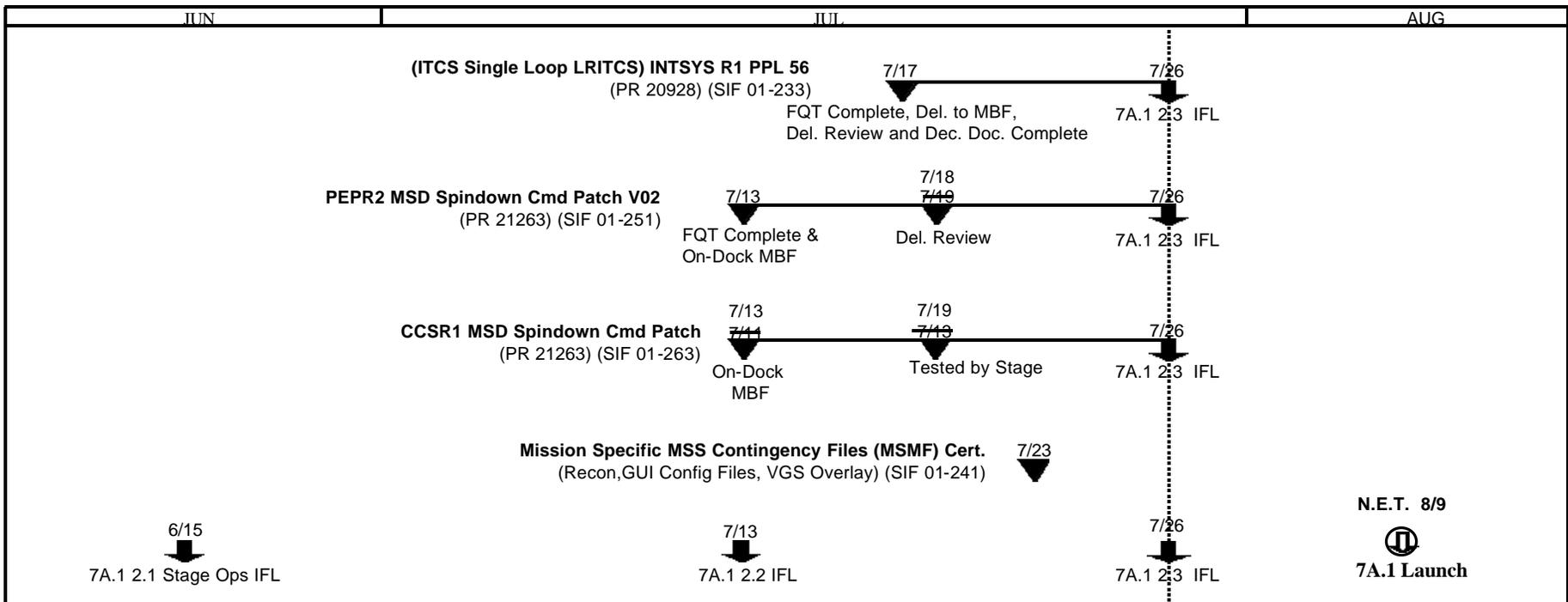
7A.1 Flight SW Plan to Launch

As of 7/26/01

G



7A.1 FSW Plan to Launch





Software Program Notes



- **627 Station Program Notes for 7A.1**
 - **589 ASCB Approved**
 - **38 In work – List in back-up**
 - **01 In Revision**
 - **09 In Review**
 - **15 JSRP Approved**
 - **07 Pending Approval**
 - **06 Created**



7A.1 FRR (8/1/01)
Research Payloads and Utilization Activities



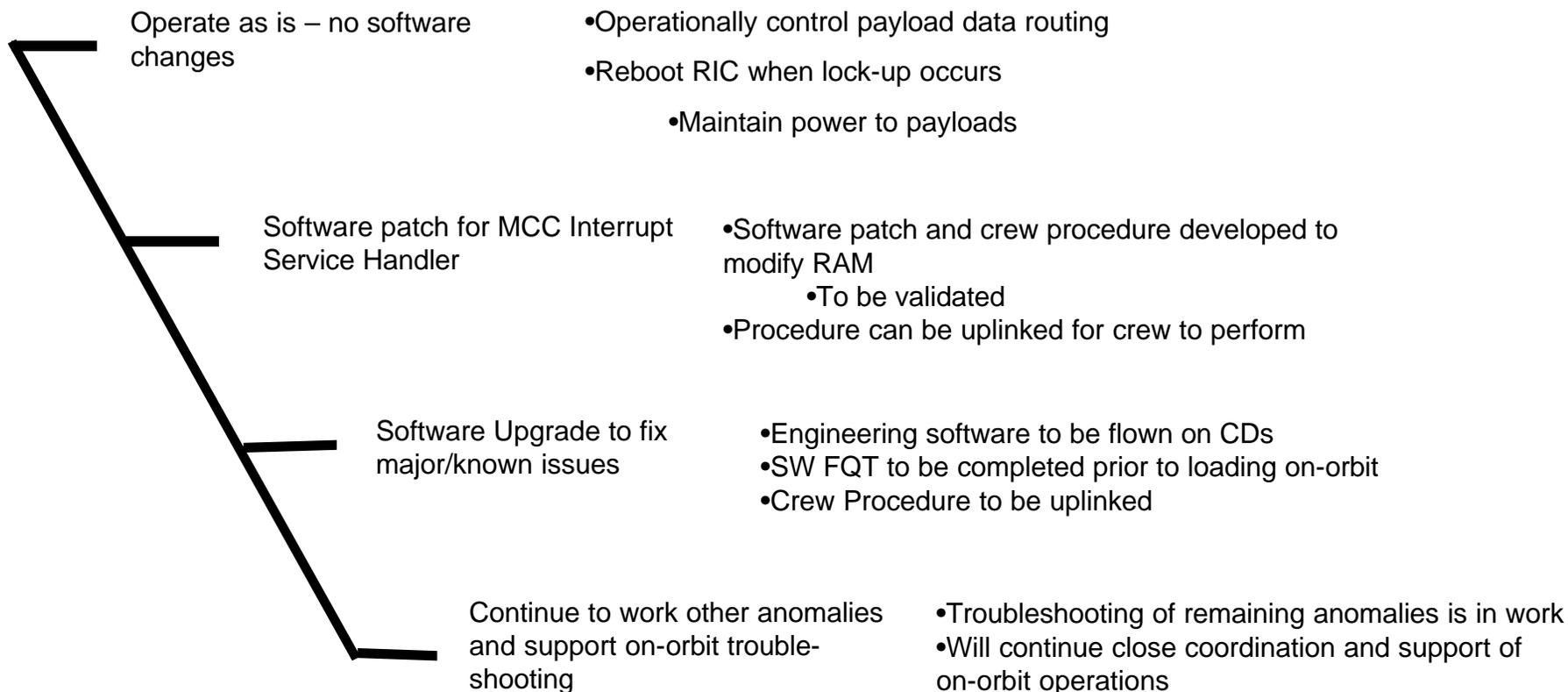
Backup Material



7A.1 FRR (8/1/01) Research Payloads and Utilization Activities



On-Orbit Anomalies



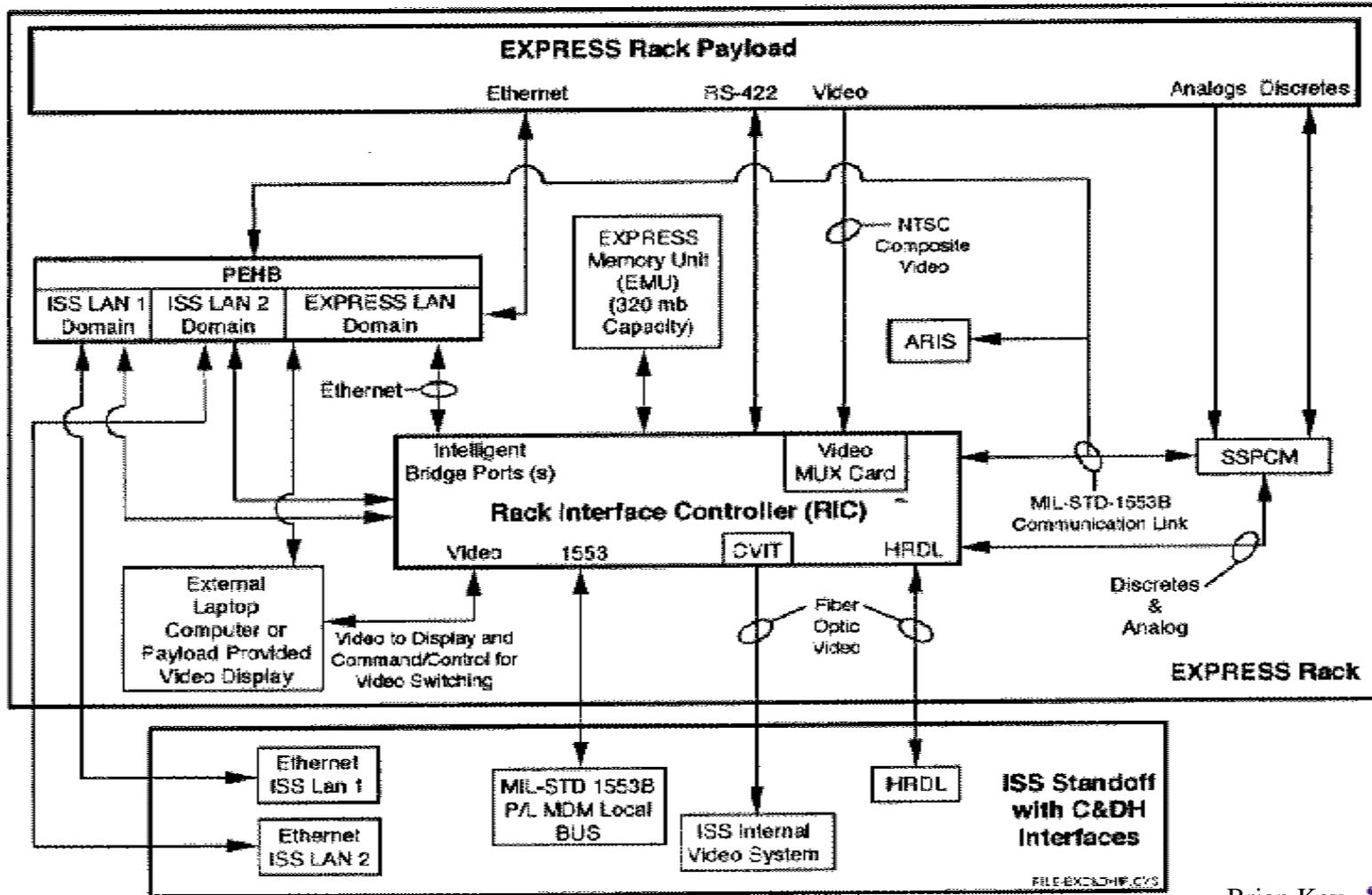
Brian Key





7A.1 FRR (8/1/01) Research Payloads and Utilization Activities

EXPRESS Rack Data Flow



Brian Key



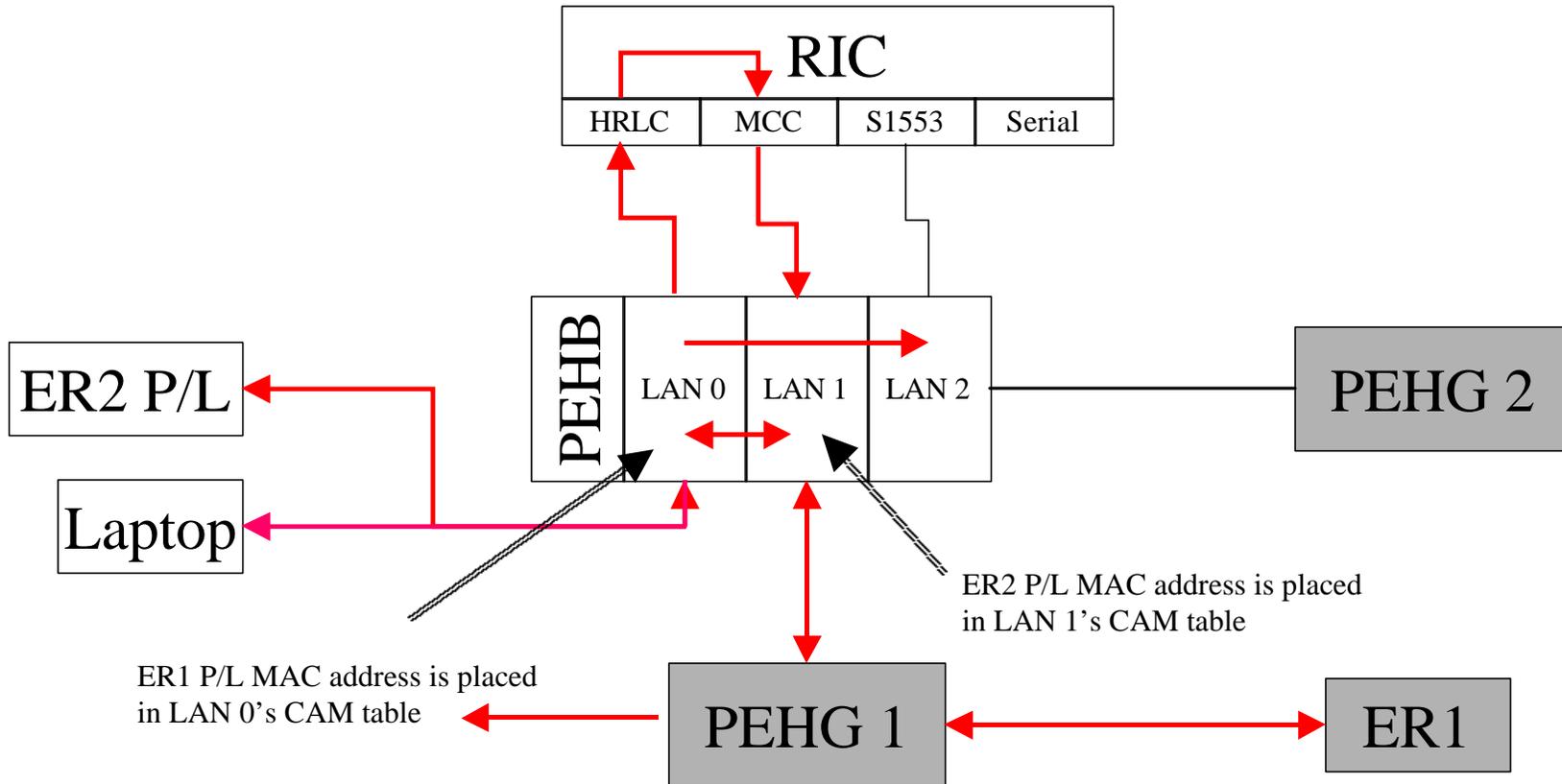


7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



Initial On-orbit data flow



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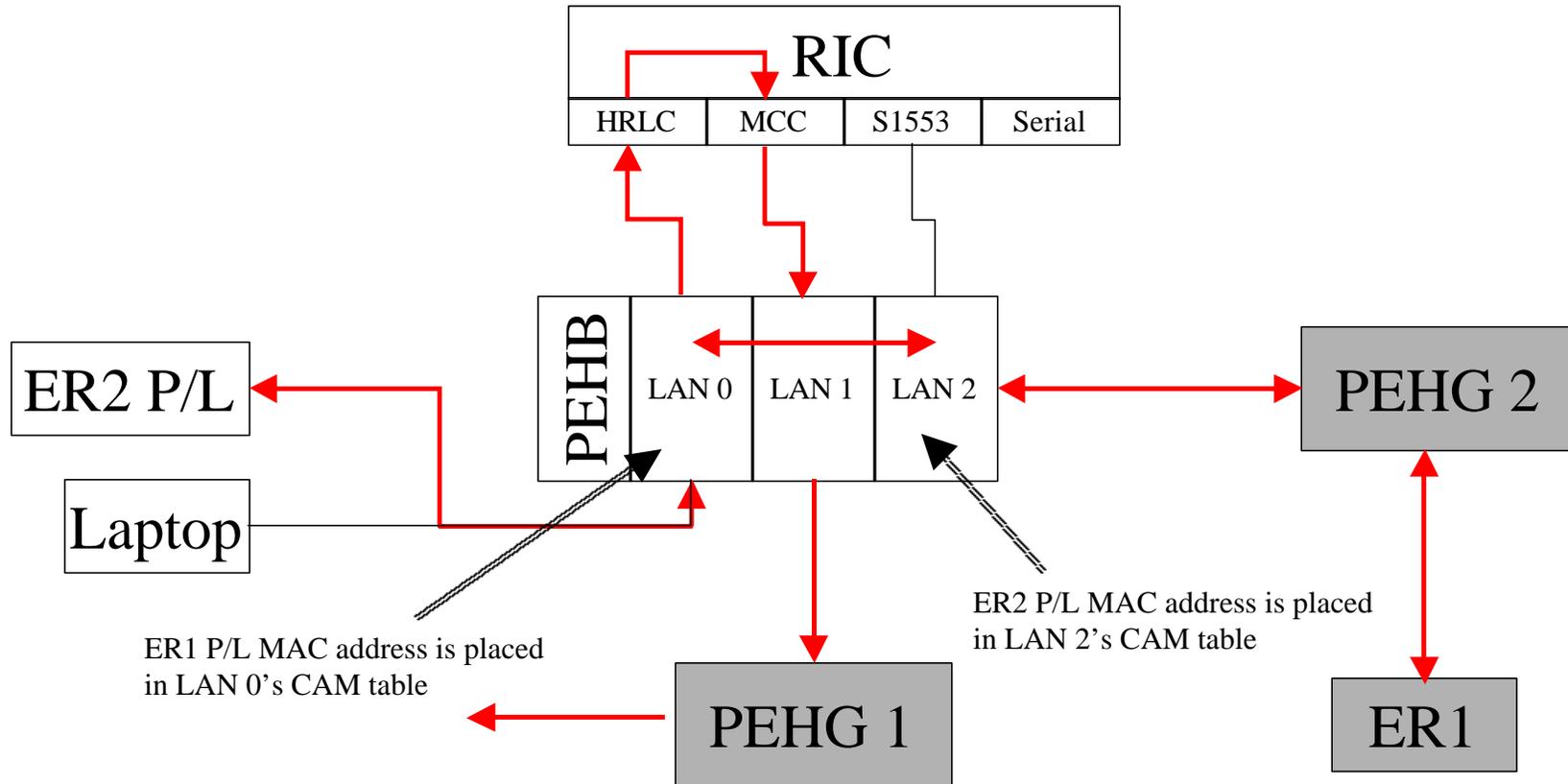


7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



Re-configuration 1 data flow



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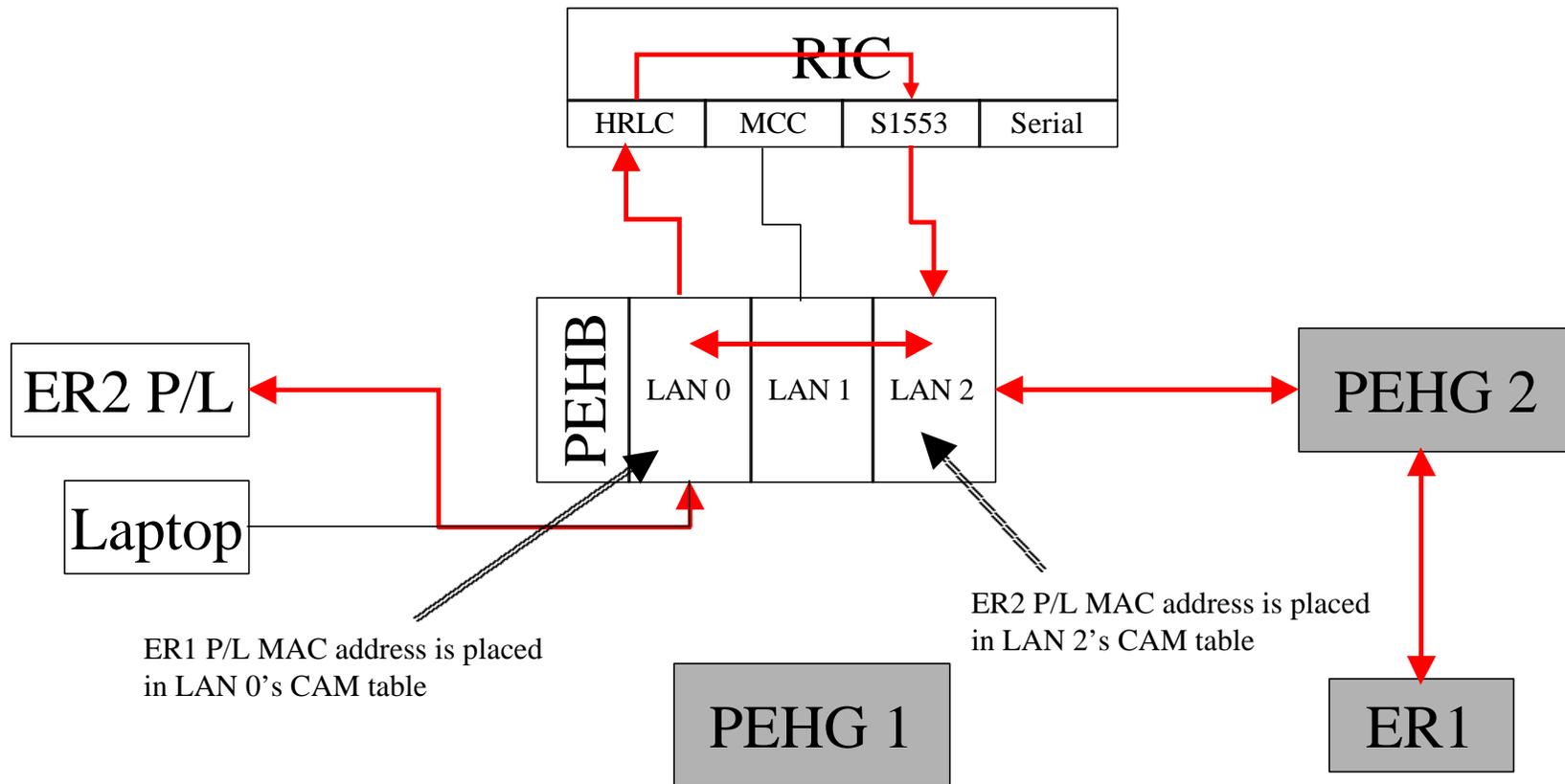


7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



Re-configuration 2 data flow



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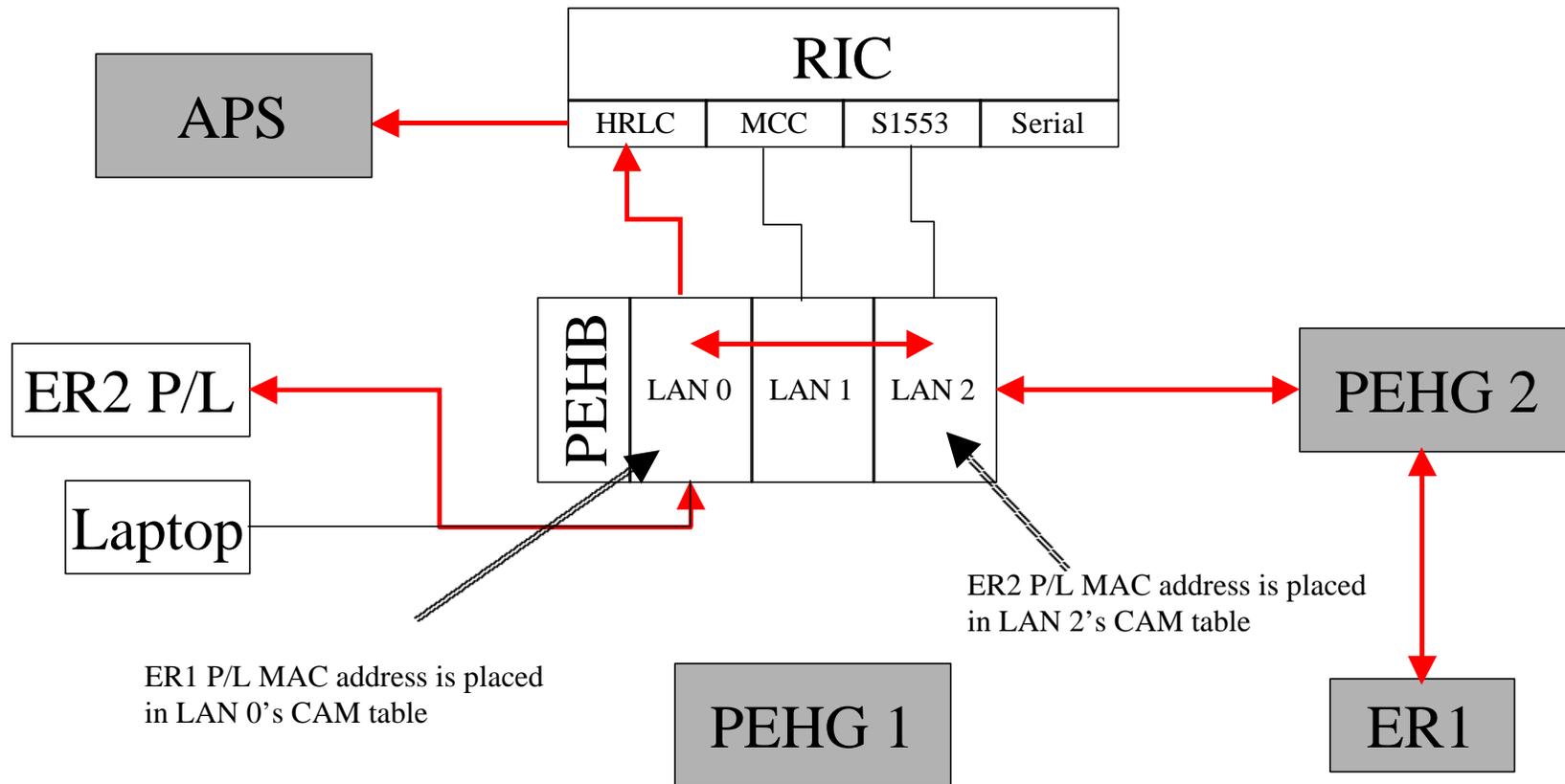


7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities



Re-configuration 3 data flow



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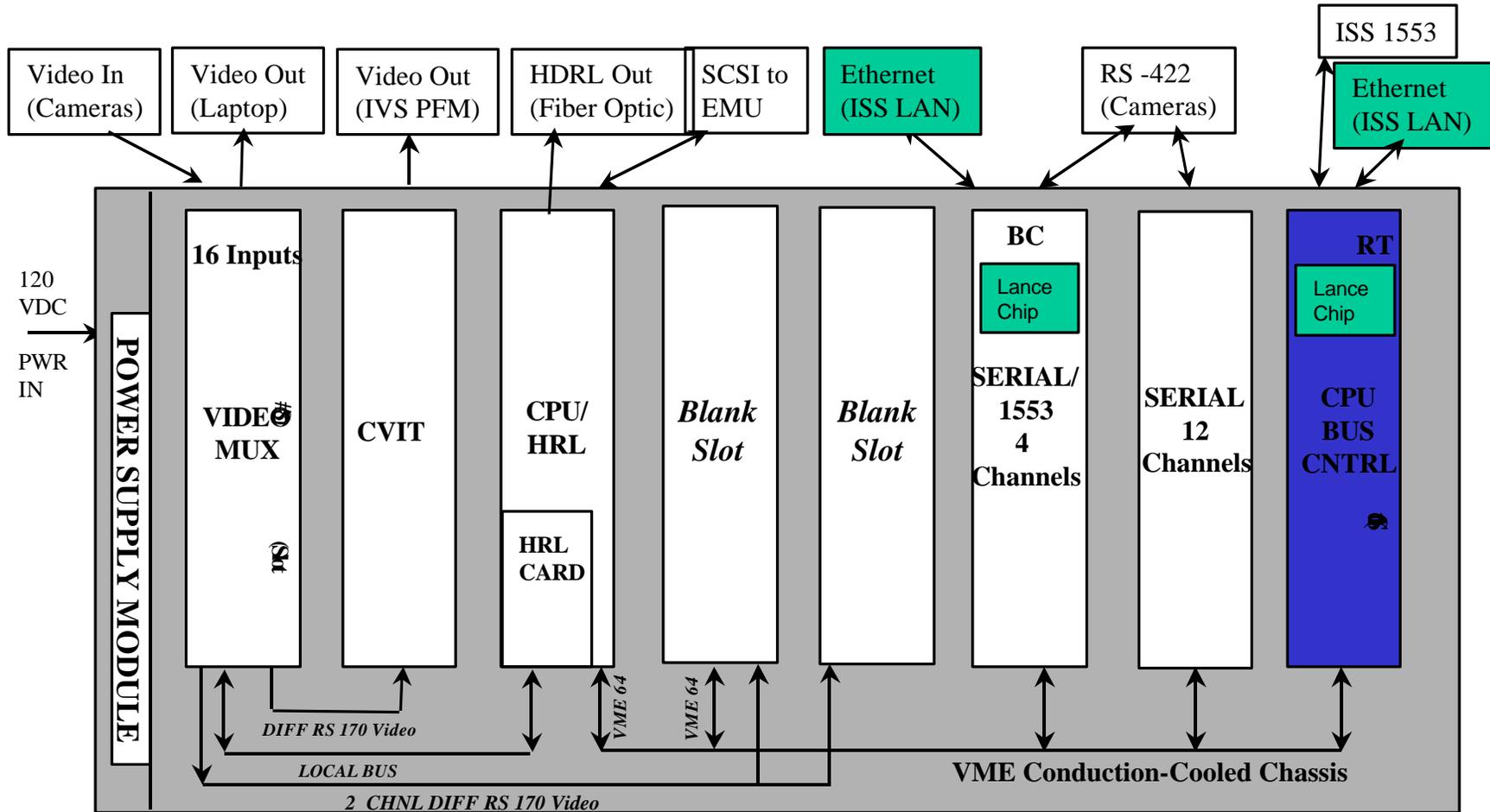




7A.1 FRR (8/1/01)

Research Payloads and Utilization Activities

Rack Interface Controller



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